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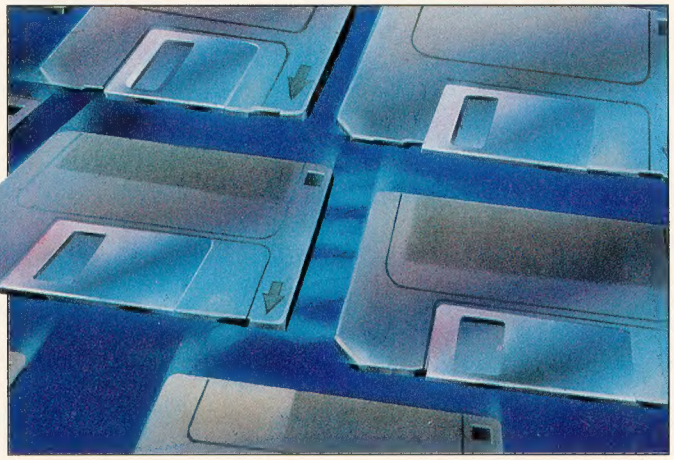

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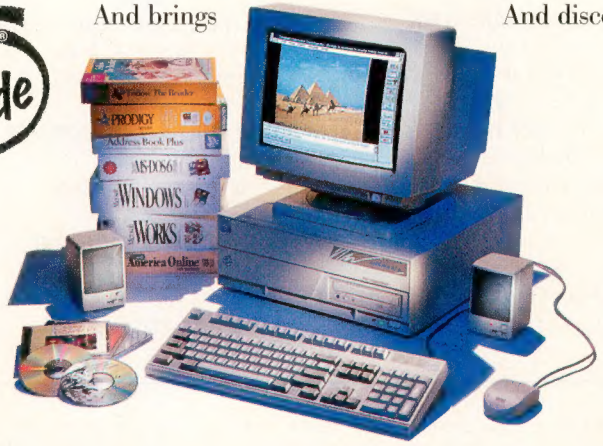

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Clifton Karnes

Recently, Microsoft released a white paper that offers us an enticing sneak preview of Windows 4.0, code-named Chicago. (The complete text of this paper is available in COMPUTE's forum on America Online with the filename CHICAQA.ZIP. To access the forum, use the keyword *COMPUTE*.)

As you may already know, Chicago is the next version of Windows, designed to replace both Windows 3.1 and Windows for Workgroups. And from reading this paper, it looks like Microsoft is including stuff from almost everyone's Windows wish list.

The most important news about Chicago for most of us is that this new operating system is being designed to be completely compatible with current DOS programs, DOS device drivers, and Windows 3.1 apps. This means that everything you're running in Windows now should work fine under Chicago. The next question for most people is, Will Chicago run on my current system? Microsoft says that on a 4MB 386, Chicago will run as fast as Windows 3.1, but with a faster processor, more memory, or both, Chicago will be faster than 3.1.

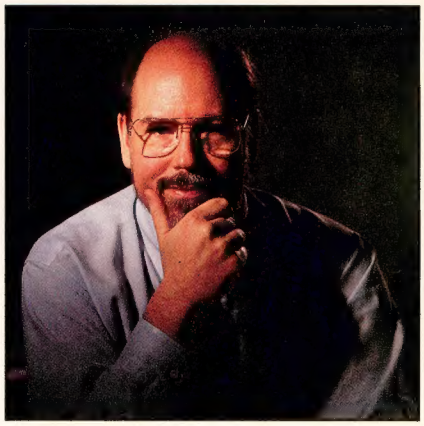
How is Chicago going to be better than Windows 3.1? According to this paper, there will be lots of improvements, but perhaps the most important advantage over Windows 3.1 is that Chicago will be a complete 32-bit protected-mode operating system. In other words, it won't sit on top of DOS the way Windows 3.1 does. And it will support preemptive multitasking, which means a faster, smoother, and more responsive system.

Microsoft isn't saying too much about Chicago's interface yet, but the system is being designed to be easier to use, and the paper does mention a system toolbar that will make it easy for us to manage applications. It's also worth noting that although the new interface appears to integrate both File Manager and Program Manager into one shell, both of these apps will still be available, in case you'd prefer to use one of them as your interface.

Beyond this, Chicago's design is focused on what Microsoft calls a document-centric approach. This means that the operating system will make it easier for us to think in terms of the work we're doing rather than the applications that manage the work. OLE 2 is going to be the main vehicle Chicago uses to make documents the focus of our work.

In addition to these features, Chicago will also, according to Microsoft, fully support Plug and Play, which is a hardware-software specification that makes it easy and foolproof to add hardware options to your system and remove them from it. Using Plug and Play, the computer will figure out how to configure interrupts, ports, DMA channels, and I/O addresses.

Tired of the eight characters DOS gave you for filenames in 1981? Well, we're finally getting long filenames in Chicago. And the system also boasts basic built-in file synchronization, so you can move files between computers and make sure your current system always has the most recent files.



Where does Chicago fit into Microsoft's Windows product line? As I mentioned earlier, Chicago is designed to replace Windows 3.1 and Windows for Workgroups, so when Chicago ships, there will be just two current Windows operating systems: Windows 4.0 and Windows NT.

When will Chicago ship? The Microsoft paper doesn't give a specific date, but says the second half of 1994. My guess would be the fourth quarter and probably late in that quarter. Christmas maybe. I don't know about you, but I can't wait to unwrap this package. ❐

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WINDOWS WORKSHOP

Clifton Karnes

WINDOWS' SOUL

Let's park under a shade tree, roll up our sleeves, and pop open Windows' hood.

Have you ever wondered what Windows really *is*? It's such a strange beast, after all. Is it a DOS program, for example? It seems to be a COM file (which is the old-fashioned DOS executable format), it runs from DOS, and after you exit Windows, the program returns to DOS. In many ways it seems like a DOS program. But it's graphical, and more important than that, it multitasks. And you can use all of your PC's extended memory with Windows, which DOS by itself certainly won't let you do.

To answer some of these questions and really understand Windows' essence, we need to talk a little about the Intel 8088, 80286, and 80386 processors, collectively known as the 80*x*86 family. The 8088, as you probably know, is the brain of the original IBM PC. It has a 16-bit register width, an 8-bit data bus, and a 20-bit address bus, all of which means it can operate on 16 bits of data at a time, can access data from memory and peripherals 8 bits at a time, and can address 1MB (2^{20}) of memory.

The 8088's 1MB address space is divided between 640K of user memory and 384K of adapter memory. This 640K seemed endless in 1981, when the machine debuted, but faster than you could sort a big database or recalculate a huge spreadsheet, it was too small.

Intel tried to solve the 8088's memory problems (as well as several other problems) with the 80286, which appeared in the IBM AT in 1983. The 80286 is completely compatible with the 8088, but it's faster (6 MHz originally, compared with the 8088's 4.77 MHz), and it can address more memory. In fact, the AT's 24-bit address bus can address a whopping 16MB of RAM. The 80286 also features an additional mode, called protected mode, which allows the processor to address this full 16MB address space. The 8088's native operating mode was dubbed real mode because of the way it addresses its 1MB of memory, using the memory's real address. The 80286's protected mode uses aliases to address memory instead of real addresses.

Unfortunately, to use protected mode and get at all the memory above the 1MB boundary, you have to abandon DOS, because DOS only works in real mode. Intel seemed to think that new operating systems would soon be developed to take advantage of protected mode and the vast RAM it offered, but these new operating systems didn't appear. There were so many mission-critical applications running under DOS that nobody wanted to switch.

So almost everyone used 80286-powered PCs simply as faster 8088s. And those giant databases and spreadsheets got bigger and bigger and bigger.

After the 80286 had been crunching numbers and sorting data for a while, some people realized that you can run the processor in real (DOS) mode and switch to protected mode to address the extended memory in the system. The trouble is that you have to restart the system to get back to real mode. For compatibility, Intel designed the 80286 to start life in real mode (the 80386 and 80486 do the same thing) and made the switch to protected mode an option. Intel obviously couldn't imagine why anyone would want to go back to real mode after having switched to protected mode, so it didn't make the gate between the two modes two-way.

The trick IBM discovered was to put a special byte in the system that the ROM BIOS would read when it was reset. If the byte was a value that said, in effect, "I'm switching from protected mode to real mode, so don't restart this computer," the CPU would go back to real mode, and everything would be cool.

VDISK, the RAM disk that comes with DOS, was the first application to use this technique. The technique is a little ugly, but it works, and it spawned a whole new category of programs called DOS extenders. DOS extenders are applications that can run part of the time in real mode and part of the time in protected mode. They, in effect, add memory management to DOS. If you've followed me so far, you may already know where I'm going: Windows is a DOS extender, and in standard mode, it works much like the early DOS extenders. However, Windows wouldn't be nearly the operating system it is (or is it an operating environment?) without the magical new features of the 80386.

With the 80386, Intel really got everything right. The processor is completely compatible with the 8088 and 80286, and it adds some powerful new features. First, it's faster than the 80286, with speeds ranging from 25 to 33 MHz. Second, it's a full 32-bit processor with 32-bit registers, a 32-bit address bus, and a 32-bit data bus. And it adds two new features that really turned Windows into a success story: a new form of memory management, called paging, and a new mode, called virtual 8086 mode.

Next month, I'll talk a little more about these new Intel 80386 modes and how Windows exploits them to create virtual memory and multitask DOS applications. ❐

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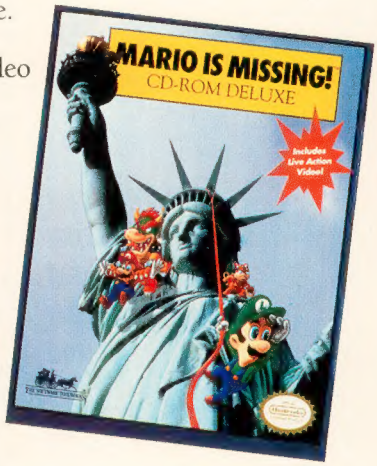

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FEEDBACK

Right on Time

I need a simple scheduler to run from my AUTOEXEC.BAT—just something to show me a daily to-do list and a way to edit it.

BILL SMITH
WASHINGTON, DC

Staying on schedule, mixing up words, and patching into your stereo

Here's a scheduler that won't cost you anything. It displays all the appointments you've entered and prompts you to add appointments, delete appointments, and edit the schedule of another day. As long as you remember to enter times in military style (for example, 1730 for 5:30 p.m. or 0900 for 9:00 a.m.), it will keep your times in order.

The variable sensitivity sets a minimum time between appointments. The default is 15 minutes, so if you set up appointments closer together than that, it will print a warning when it displays the schedule (not when you're entering it, though). If you want to change this to 30 minutes or an hour, change sensitivity to equal 30 or 60.

The program even incorporates a to-do list that's carried forward from day to day. To add something to the to-do list, just precede it with an exclamation point. It will be copied from the previous day to the current day. Items on the to-do list tend to be persistent. If you delete an item from today's to-do list and leave it on yesterday's and then run the program again, the item will return to today's to-do list. Therefore, to permanently remove an item from the to-do list, delete it from today's list and *yesterday's list. Any other notes (unless they begin with a punctuation mark) will follow the time schedule and will not be brought forward.*

You'll be prompted to bring to-do lists forward (recommended for Mondays or any day after you don't use the scheduler for over 24 hours). This pulls all of the to-do lists from each of the days of the week, places them in the current day, and erases the to-do list from every day except the current one.

To print your schedule, bring it onto the screen and press the Print Screen key.

```
CLS
oncethru = 0
OPEN "return.!!!" FOR
 OUTPUT AS #1
PRINT #1,
CLOSE
day$ =
 "SunMonTueWedThuFriSat"
FOR i = 1 TO 19 STEP 3
a$ = MID$(day$, i, 3)
OPEN a$ + ".!!!" FOR
 APPEND AS #1
PRINT #1,
CLOSE
NEXT
SHELL "date > junk.!!! <
 return.!!!"
OPEN "junk.!!!" FOR INPUT
 AS #1
LINE INPUT #1, a$
SHELL "del junk.!!!"
SHELL "del return.!!!"
FOR i = 1 TO 19 STEP 3
IF INSTR(a$, MID$(day$, i, 3))
 THEN
a$ = MID$(day$, i, 3): today$
 = a$
i = i - 3: IF i < 0 THEN i = 19
a1$ = MID$(day$, i, 3)
CLOSE
GOTO check
END IF
NEXT
PRINT "Error": END
check:
CLS
OPEN a1$ + ".!!!" FOR
 INPUT AS #2
OPEN a$ + ".!!!" FOR
 APPEND AS #1
WHILE NOT EOF(2)
LINE INPUT #2, a2$
IF LEFT$(a2$, 1) = "!" THEN
 PRINT #1, a2$
WEND
CLOSE
GOSUB organize
check1:
PRINT UCASE$(a$) +
 " SCHEDULE" + CHR$(13)
OPEN a$ + ".!!!" FOR INPUT
 AS #1
WHILE NOT EOF(1)
LINE INPUT #1, b$
PRINT b$
WEND
CLOSE
IF oncethru <> 1 THEN
oncethru = 1
INPUT "Bring forward all to-do
 lists?", b$
IF LCASE$(b$) = "y" THEN
 GOSUB recollect: GOTO check1
END IF
NewAppointments:
PRINT CHR$(13) + "Type
 additional entries or press"
INPUT "Enter to continue:", b$
IF b$ = "" THEN GOTO deletestuff
OPEN a$ + ".!!!" FOR APPEND
 AS #1
PRINT #1, b$
CLOSE
GOSUB organize
GOTO NewAppointments
deletestuff:
PRINT CHR$(13) + "Are there
 entries in this"
PRINT "file that you would like"
INPUT "to delete?<y/N>", b$
IF LCASE$(b$) <> "y" THEN
 GOTO makeotherchanges
OPEN a$ + ".!!!" FOR INPUT
 AS #1
OPEN "junk.!!!" FOR OUTPUT
 AS #2
WHILE NOT EOF(1)
LINE INPUT #1, b$
PRINT b$
INPUT "Keep? <Y/n/q>", c$
IF LCASE$(c$) = "q" THEN CLOSE
 : END
IF LCASE$(c$) <> "n" THEN
 PRINT #2, b$
WEND
CLOSE
GOSUB swapper
makeotherchanges:
PRINT CHR$(13) + "If you would
 like"
PRINT "to edit another day's
 schedule,"
PRINT "enter the first three"
INPUT "letters of day to edit:", b$
IF LEN(b$) <> 3 OR
 (INSTR(LCASE$(day$), b$) = 0)
 THEN END
```

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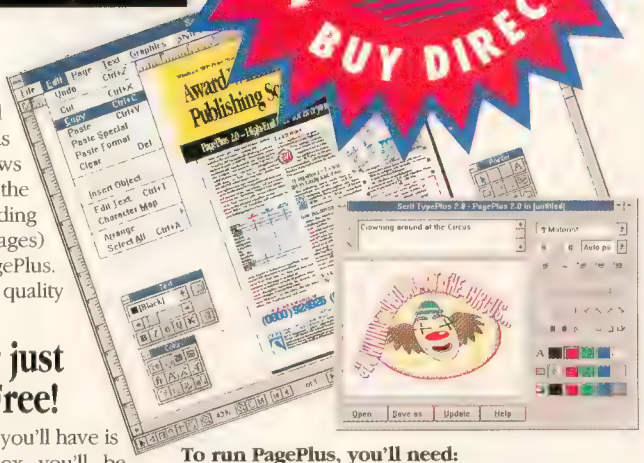

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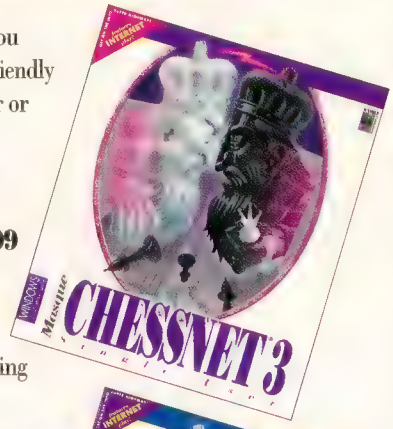

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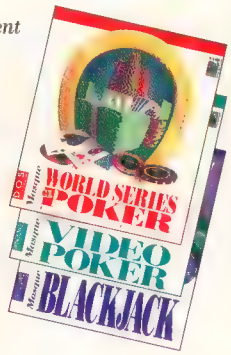

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Masque Publishing

MASQUE Publishing

FEEDBACK

```
a$ = b$
GOSUB organize
GOTO check1
organize:
SHELL "type " + a$ + ".!!! >
 junk.!!! | sort"
GOSUB swapper
OPEN a$ + ".!!!" FOR INPUT
 AS #1
OPEN "junk.!!!" FOR OUTPUT
 AS #2
b1$ = ""
WHILE NOT EOF(1)
LINE INPUT #1, a1$
IF a1$ <> b1$ AND a1$ <>
 CHR$(13) AND a1$ <> "" AND
 LEFT$(a1$, 1) <> CHR$(255)
 THEN
PRINT #2, a1$
sensitivity = 15
IF b1$ <> "" THEN
IF ASC(a1$) < 51 AND ASC(a1$)
 > 47 AND ASC(b1$) < 51 AND
 ASC(b1$) > 47 THEN
a1min = VAL(MID$(a1$, 3, 2)) +
 60 * VAL(LEFT$(a1$, 2))
b1min = VAL(MID$(b1$, 3, 2)) +
 60 * VAL(LEFT$(b1$, 2))
IF ABS(a1min - b1min) <
 sensitivity THEN PRINT #2,
 CHR$(255) + "POSSIBLE
 CONFLICT!!!"
END IF
END IF
END IF
b1$ = a1$
WEND
CLOSE
GOSUB swapper
RETURN
recollect:
a3$ = a$
OPEN a3$ + ".!!!" FOR APPEND
 AS #1
FOR i = 1 TO 19 STEP 3
a$ = MID$(day$, i, 3)
IF a$ <> a3$ THEN
OPEN a$ + ".!!!" FOR INPUT
 AS #2
OPEN "junk.!!!" FOR OUTPUT
 AS #3
WHILE NOT EOF(2)
LINE INPUT #2, a4$
IF LEFT$(a4$, 1) = "!"
 THEN
PRINT #1, a4$
ELSE
PRINT #3, a4$
END IF
WEND
CLOSE 2
CLOSE 3
GOSUB swapper
END IF
NEXT
CLOSE
a$ = a3$
GOSUB organize
RETURN
swapper:
SHELL "del " + a$ + ".!!!"
SHELL "ren junk.!!! " + a$ +
 ".!!!"
RETURN
```

Mixed-Up World

I want a program that will mix up words and create anagrams.

BILL HALLEY
LOS ANGELES, CA

Here's a program that asks what word you want anagrams of and how many anagrams you want. It would be fairly simple to create a similar program that mechanically creates each of the possible anagrams of a word of any length, but this program takes a slightly different approach, shuffling letters until it finds an anagram different from the anagrams it has previously generated.

Its major limitation is the amount of space the string storage takes up in memory, so if you want to make the program generate more anagrams, eliminate the routine that makes sure each of your anagrams is unique. This routine begins with the line FOR i = 0 TO counter.

```
DIM b$(100): DIM c$(g)
RANDOMIZE TIMER
counter = 0
INPUT "How many anagrams do
 you want?"; c
INPUT "Enter word to mix up.";
 a$
IF LEN(a$) < 3 THEN PRINT
 "Error. Word too short.": END
m = LEN(a$)
FOR i = 2 TO LEN(a$) - 1
m = m * i
NEXT
IF LEN(a$) < 8 THEN
REDIM c$(m)
ELSE
REDIM c$(c)
END IF
IF c > m THEN
PRINT "Error. You have asked
 for too many anagrams."
PRINT "You can't have more
 than"; m; " different anagrams
 for a word "; LEN(a$); " letters
 long."
```

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FEEDBACK

```
 END
END IF
FOR i = 1 TO LEN(a$)
b$(i) = MID$(a$, i, 1)
NEXT
FOR j = 1 TO c
FOR i = 0 TO 10 * LEN(a$)
top:
a = INT(RND * LEN(a$) + 1)
b = INT(RND * LEN(a$) + 1)
IF a = b THEN GOTO top
SWAP b$(a), b$(b)
NEXT
FOR i = 1 TO LEN(a$)
d$ = d$ + b$(i)
NEXT
FOR i = 0 TO counter
IF d$ = c$(i) THEN d$ = "":
GOTO
 top
NEXT
PRINT counter + 1; d$
c$(counter) = d$
counter = counter + 1
d$ = ""
NEXT
```

Is the Stereo Sound?

I read "Open Windows to Sound" (November 1993 issue) and decided to use my stereo in place of either unpowered or powered computer speakers for multimedia sound. I placed it on a shelf above my computer and used a patch cord to connect the two. I have all the power I need to drive the speakers, I eliminated the need to pay for additional speakers, I can adjust the volume with the stereo amplifier instead of fooling around with dialog boxes, sound cards, or volume controls on the speakers themselves, I can play the radio anytime I want, and I can record sound from the CD-ROM drive. Am I running any risk with this setup?

I also wonder about the hazards of unshielded speakers. Are they a problem?

FRANK O. POSPISIL
SAN DIEGO, CA

Better call the manufacturer and confirm that what you're doing is safe. Most sound-card output jacks are designed to drive unpowered speakers and might be delivering eight watts or more to the poor overheated transistors in your stereo system's preamp. Some sound cards have outputs that automatically detect the impedance of the circuit plugged into them and adjust the output to match, but this is relatively rare, and if your system doesn't do that, you may be slowly frying your preamp.

As to the question about unshielded speakers, if you keep your speakers a sufficient distance from floppy disks, backup tapes, and other media that might be ruined by stray magnetism, they probably pose no risk. Almost all speakers have permanent magnets against which the solenoid action of the voice coil acts, resulting in the vibrations some people call music. These magnets can be very massive, sometimes weighing several pounds, and can generate significant magnetic fields. Hold your speakers next to your monitor and see whether the picture or color is distorted. If not, then you probably have nothing to worry about. If the image is distorted or if it changes color near the speaker, take the precaution of keeping the speakers at least a few inches away from your floppies, audiotapes, and backup tapes.

Do you have a question about hardware or software? Or have you discovered something that could help other PC users? If so, we want to hear from you. Call our special "Feedback" line: (900) 884-8681, extension 7010201 (sponsored by Pure Entertainment, P.O. Box 186, Hollywood, California 90078). The call will cost 95 cents per minute, you must be 18 or older, and you must use a touch-tone phone. Or write to "Feedback" in care of this magazine. Readers whose letters or calls appear in "Feedback" will receive a free COMPUTE baseball cap while supplies last. We regret that we cannot provide personal replies to technical questions. ❐

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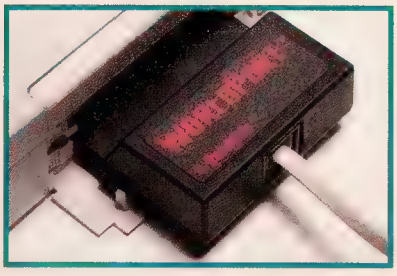

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Circle Reader Service Number 112

INTRODOS

Tony Roberts

ADVANCED DOS SCANNER

ScanDisk brings high-powered disk maintenance utilities to DOS.

Microsoft's DOS 6.2 includes a utility called ScanDisk, a disk repair program that anyone using a DOS-based computer should know about.

ScanDisk is similar to disk repair utilities found in packages such as The Norton Utilities and PC Tools. ScanDisk goes far beyond the capabilities of the aging Chkdsk.

Regular use of the program can help keep your hard drives error-free and working smoothly. I activate the program via the AUTOEXEC.BAT file so that it runs every time I boot up. This way, problems are corrected shortly after they occur. Left uncorrected, disk structure problems are time bombs.

Disk problems come in two varieties: logical and physical. Logical errors have to do with the way data is stored and tracked on your disk. Physical errors result from a breakdown in the recording ability of the disk itself.

The logical error you're most likely to encounter is lost clusters. In most cases, lost clusters are not serious, but they do occupy disk space and should be eliminated. A lost cluster is an area on the disk that's marked as being occupied but that has no corresponding directory entry.

Lost clusters often occur as a result of a system or program crash. If a program opens a file but is unable to complete the directory entry for that file, lost clusters may result. Under normal circumstances, lost clusters do no more than occupy disk space. Occasionally, though, some programs behave erratically until the lost clusters are removed.

To avoid lost clusters, make sure to properly exit all your software—including Windows—before shutting off your computer.

When ScanDisk finds lost clusters, it gathers up the information in those clusters and saves it to a file with a CHK extension in your root directory. In most cases, this data is gobbledygook. On occasion, however, you may be able to recover some important data from a CHK file. It's usually safe to delete the CHK files unless you discover that you're missing some important data following a system crash or power failure.

Another more serious logical error is file cross-linking. Under this condition, two files lay claim to the data in a single cluster, much as two words in a crossword puzzle share the same letter. What works in puzzles, however, is disaster on a computer disk.

ScanDisk resolves the cross-linked file problem by separating the files and giving each a copy of the shared data. This is a definite improvement over Chkdsk's approach, which either truncates or deletes one or both files. Despite this more benevolent treatment, it's likely that one or both files involved in the cross-link will include data that once belonged to the other.

After a cross-link problem is corrected, examine each file for damage. If a program file is damaged, repair is next to impossible, so install a new copy from your original disks. If a text file is damaged, you should be able to salvage all but the area that was involved in the cross-link.

To identify physical errors, ScanDisk performs a surface scan. During the scan, the program makes sure that each area of the disk can be written to and read from reliably. If ScanDisk finds any weak area on the disk, it moves the data found there to a safe location, and it marks the suspect area as bad so no program will attempt to store data there again.

ScanDisk works on hard disks, floppy disks, and DoubleSpace drives, but not on network drives or CD-ROM drives.

To run the program, type *scandisk* at the DOS prompt. Used without switches, ScanDisk checks out the default drive and then asks if you want to run a surface scan.

If the program encounters errors, it will ask whether you want to create an undo disk. If you agree, ScanDisk will record on a floppy disk any changes it makes.

If, for some reason, things are worse after the repair than before, you can use the undo disk to put things back the way they were and attempt another solution.

ScanDisk includes several switches that allow you to change the way it operates. For a full listing, type *help scandisk* at the DOS prompt. These switches allow ScanDisk to do such things as checking all available drives, automatically undertaking repairs, and skipping the surface scan. These options make it possible to configure ScanDisk to run successfully from a batch file.

Because ScanDisk checks out the structure and integrity of your disks, it needs to do its work when no other disk activity is taking place. Don't run ScanDisk while Windows, Task Swapper, or any other program that might access the disk is active.

Though once it was conventional wisdom to run Chkdsk once a day, now ScanDisk—or a similar disk repair utility—should get regular use on every system. Preventive maintenance pays off. If you don't have such a program, it's worth looking into. ❐

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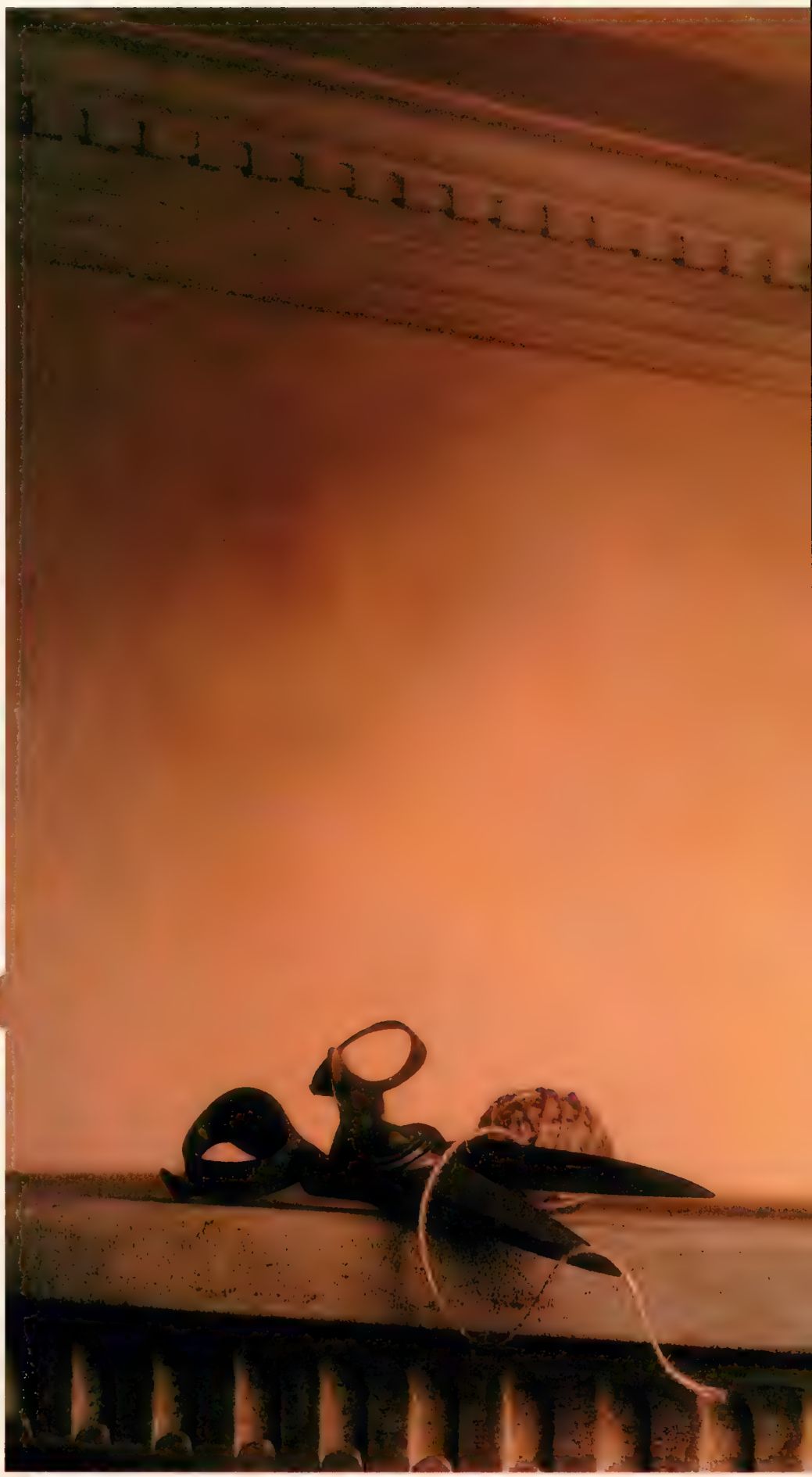

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Corporation. [1]Size and weight indicated are for the Contura Aero 4/25 Model 84 and Model 170. Model 4/33C pictured here weighs 4.2 lbs. [2]Batteries and certain options covered by a one-year warranty. For further information on our pictured here starting at $2,199. The Intel Inside Logo is a registered trademark of the Intel Corporation.

TEST LAB

Edited by Mike Hudnall
Reviews by Jean Marchant

Subnotebook computers represent, in many respects, cutting-edge technology. To provide more computing muscle in a smaller and lighter package with an acceptable display and longer battery life, manufacturers have had to show real ingenuity in their choice of materials, software and hardware decisions, and overall design. Our increasingly competitive and mobile society demands this kind of ingenuity, and the subnotebooks in this month's Test Lab go far toward meeting those demands.

For the purposes of this roundup, we said that each subnotebook (including battery, but not AC adapter) should weigh five pounds or less. Our review of seven units does, however, include one unit, the Panasonic CF-1000A, which weighed in at just over five pounds, but we felt that it deserved to be included in spite of this slight excess weight. All of the units in our test (and most of those available today) are noncolor units.

All but one of the units in our test include some type of integrated pointing device. While this kind of integration keeps the size and weight of these devices down, most of them leave something to be desired. Many subnotebook users will probably opt to use keyboard shortcuts for most functions.

In all but one unit in our test, a floppy drive is not included in the main unit. An external floppy drive is a reasonable compromise for times when weight and size are issues, since some of the most usual uses for a floppy drive include installation of software and exchange of data, and those tasks are typically done when weight and size are less important concerns.

Because of the small footprints of these machines, their keyboards do tend to be too cramped for typing for a prolonged period of time. In some cases, the design of the keyboard is such that typing for any length of time could cause discomfort. Also, a small footprint limits the size of the display. What you look for in a display or a keyboard is a matter of personal preference, so it makes good sense to try them out if at all possible before you make a decision. If that isn't possible, check out the return policy of the company from which you buy your subnotebook.

As computers have become smaller and smaller, they have also become more and more powerful. The units tested are all capable of running Windows (although the HP OmniBook runs Windows only in standard mode) with quite reasonable performance. All units came packaged with software (minimally DOS and Windows and in some cases a lot more).

Subnotebook manufacturers have designed many features to enhance power management so that longer and longer battery life can be expected. From NiMH batteries that provide longer life to display technology that reduces the drain on the battery to advanced power management software, there are a number of ways to obtain longer battery life.

For detailed evaluation of each subnotebook, look to the reviews, where particular strengths, weaknesses, and recommendations are presented. If you'd like to look at the features of these subnotebooks side by side, you'll want to study the table of features. And if you're interested in how well these computers perform and how long their batteries last, take a look at the benchmark graphs. Whatever your needs in a subnotebook, Test Lab can help you make a more informed decision.

JEAN MARCHANT

EPSON ACTIONNOTE 4000

Epson ActionNote 4000
Suggested retail price: $2,099 (direct price: $1,969)
Warranty: one year (includes Extra Care Road Service, whereby if a unit fails, Epson will provide a replacement unit the next business day)

EPSON AMERICA
20770 Madrona Ave.
Torrance, CA 90503
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At 3.85 pounds, the ActionNote is one of the lighter machines that we tested, and it turned in one of the faster hardware performances, coming in second in the Norton SysInfo performance measurements. Thanks to very good display contrast and support for 64 shades of gray, the ActionNote also has one of the better screens.

Although this machine comes standard with 4MB RAM, you can upgrade the memory to 8MB. Epson offers you two hard drive options, 80MB and 120MB; both are removable drives. The floppy drive is external, which is the norm for subnotebooks. The

ActionNote's single Type II PCMCIA slot supports Type I/II memory and I/O cards. Two fax/data modem PC cards are available, one supporting 2400 and 9600 bps and the other supporting 14,400 bps.

There are times when a small display just won't suit your purposes. Fortunately, the ActionNote allows you to attach an external monitor at a resolution of 640 × 480 with 16 colors or 800 × 600 with 16 colors. DOS 6 and Windows 3.1 come preloaded on the hard drive.

Designing a keyboard for a subnotebook presents certain challenges. The keyboard on this subnotebook leaves a bit to be desired. I find the key placement a little confusing, since the right Shift key is outside the up-arrow key, and reaching the right Shift key is more of a stretch on this keyboard than on most keyboards. Also, I find the keys hard to press on this keyboard. The front of the keyboard on this unit is almost an inch above the work surface, which I regard as too high for comfortable typing. Epson includes a port for either a PS/2-compatible pointing device or a keyboard, so if you're using the machine at the office rather than on the road, you can plug in a desktop keyboard if you want.

Pointing devices also present a challenge to designers of these subnotebooks. Like most subnotebooks, the ActionNote includes a less-than-ideal pointing device—in this case, a built-in two-button trackball. Epson has located it in the upper right corner, just above the keyboard. By default, the left button is placed to the right of the trackball, and the right button is placed to the front. Many of COMPUTE's readers would probably seriously consider using keyboard commands.

Light weight, very good performance, and very good display options make the ActionNote a subnotebook you should consider.

Circle Reader Service Number 371

Gateway 2000 HandBook 486SX-25
Direct price: $1,495
Warranty: one year, parts and labor

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GATEWAY 2000 HANDBOOK 486SX-25

With dimensions of 9.75 × 5.9 × 1.6 inches, the 2.94-pound HandBook from Gateway 2000 is extremely portable. In fact, it's the smallest unit in our roundup. Though small, the HandBook fared well in the Norton SysInfo performance measurements.

Standard on this unit is 4MB memory, expandable to 8MB or 20MB. The 80MB IDE hard drive has a 15-ms average access time. The optional external floppy drive uses the parallel port. There's one Type II PCMCIA slot, which can accommodate optional cards, including a 2400-/9600-bps fax/data modem, a 14,400-bps fax/data modem, an Ethernet BNC adapter, and an Ethernet Twisted Pair adapter. You also get a serial port and a PS/2-style external keyboard port. Packaged software includes DOS 6, Windows 3.1, and power management software with four preset battery power settings plus the option to customize settings of the six major power control items.

One of the negatives with this unit is that the display's aspect ratio has been compromised so that a 7.9-inch screen (measured diagonally) will fit into the very trim packaging. On this screen people in a photo look fatter than usual.

Instead of a trackball, Gateway uses a "pointing stick," placed on the right side of the keyboard. The buttons, however, are located on the front of the unit. I found it difficult to feel in control of the pointing device, and it seemed that upward movements required more pressure than expected. Also, if you're left-handed, you might find this pointing device more of a challenge than you'd like.

At about an inch above the work surface, the keyboard is a little too high for comfortable typing. Some of the special keys (for example, function keys, Insert, Delete, and arrow keys) are quite small—again a compromise needed to fit so much into a small package. Except for the size of some of the special keys, the keyboard has a fairly nice feel.

When running the battery-life tests on this unit, we used the Maximum Battery Life setting in the Power Management menu, but we needed to use the Auto Low setting for CPU performance. The Maximum Power Savings setting didn't work with our test suite.

The HandBook is an ideal choice if you want a very small and lightweight computer capable of running Windows in 386 enhanced mode and if you can work with (or around) the built-in pointing device. Gateway offers a 40-MHz 486DX2 (Intel Enhanced SL) version of the HandBook for about $500 more. According to Gateway, it has the same dimensions, weight, and battery life as the 486SX version, but the hard drive is 130MB rather than 80MB. Gateway also offers a ColorBook, which is larger (11.7 × 8.5 × 1.77 inches) and heavier (5.7 pounds) than its HandBooks and comes in 25-MHz 486SX and 33-MHz 486DX versions.

Circle Reader Service Number 372

HEWLETT-PACKARD OMNIBOOK 425

Hewlett-Packard OmniBook 425
Suggested retail price: $2,375 for version with 10MB flash disk; $2,125 for version with 40MB hard drive
Warranty: one year, parts and labor

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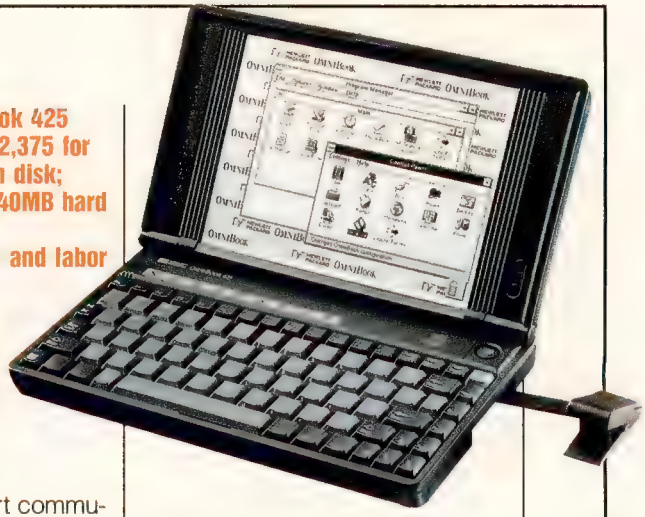


A number of unique features distinguish HP's OmniBook from the other subnotebooks in this month's roundup. With software applications preloaded in ROM, the OmniBook is the most ready-to-use unit in the group.

Applications provided by HP include scaled-down versions of Word for Windows 2.0, Excel 4.0, DOS 5, and Windows 3.1. Also packaged with the unit are LapLink Remote Access, a phone book, an appointment book, and the HP Financial Calculator. The bidirectional infrared port communicates (wirelessly) via LapLink with a handful of other products. The default LapLink speed is 2400 bps.

I found the nonbacklit LCD a little hard to read in dim lighting, but it's less of a power drain than a backlit model. The pop-out mouse on this unit is the best pointing device in the group, and the keyboard is one of the best, with a better "feel" and fewer function key combinations than most.

Because of some of the unique features of this computer, there were some difficulties in executing the test suite designed for this Test Lab roundup. The first problem arose with the performance test. The base memory configuration for this unit is 2MB, and the database application in our test would not run in this configuration. To remedy the problem, I installed a 2MB RAM expansion card, bringing total RAM in the OmniBook to 4MB. It was easy to install and configure the memory, and with it, I was able to complete the performance test suite successfully.

The performance of this machine in the database portion of the test was slow, but its performance in the word processor and spreadsheet portions of the test was reasonable. General Protection Faults appeared during the battery-life test with the ROM-based versions of WinWord and Excel, but only after the test loop had completed several iterations. The HP phone and appointment apps were placed in the test script in place of WinWord and Excel, and the suite then executed without errors. HP claims up to 4½ hours typical battery life for this hard disk model and up to 8 hours for the flash disk model.

The OmniBook requires several drivers which use a lot of RAM. After these drivers are loaded, you're left with less than 415K conventional RAM. By fiddling with the software, you can get more memory. The default CONFIG.SYS does not load DOS into high memory. In addition, Windows on the OmniBook is supported only in standard mode.

You can connect an optional external 3½-inch drive to the parallel port, but keep in mind that it's not speedy; this one turned out to be the slowest of those we tested. As for the hard drive, the tested model came with a 40MB unit. With DoubleSpace and the apps preloaded in ROM, there's a fair amount of room for data files if you don't need to load too many additional applications. Instead of using the hard drive, you can use a 10MB flash disk, but even with no additional applications loaded and with DoubleSpace, you could run out of disk space quickly.

This sleek unit will be extremely appealing to users whose needs for applications can be met with the bundled ROM-based apps. This unit will also be a top choice for subnotebook users who want the feel and control of a mouse rather than a trackball on their portable units.

Circle Reader Service Number 373

A NOTE ON PRICES

With computer products changing more rapidly than ever before and with options more plentiful than ever before, computer prices can be a tricky business.

It pays to keep the following points in mind:

Street prices and direct prices can be considerably lower than suggested retail prices.

Because consumers are more sophisticated than ever about what they want in computer products and because manufacturers have responded with more options and configurations than ever, one computer model may be subject to dozens of variations, each with a slightly different price. Also, because of the rapid changes in this market, a product and its options may have changed by the time our review sees print.

Remember, too, that you're buying support in addition to the computer. Find the support policy that meets your particular needs.

At COMPUTE, we make every effort to verify prices and differentiate between the price for a review configuration and the price for a standard configuration. The list price we present is usually for a standard configuration. It's still a good idea, however, to call the manufacturer or vendor to make sure that the configuration you want matches the price you have in mind.

—MIKE HUDNALL

Lowest Prices on the SX, DX & *New* DX2-50!

Rave Reviews! Read what the experts say:

PC MAGAZINE "Scoring high in overall value and design, the Micro Electronics WinBook gives you a lot for your money, including an outstanding integral trackball."

PC MAGAZINE, Guide to Portable Computing, 8/93

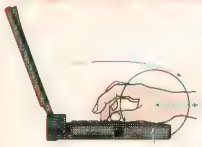
COMPUTER SHOPPER "If you're a Windows user on a budget, or just have a bad case of Mac envy...you should take a look at the WinBook. It's a machine that can hold its own with more expensive, less thoughtfully designed systems from other direct vendors."

COMPUTER SHOPPER, This Powerbook Twin Acts Like a PC, 9/93

WINDOWS MAGAZINE "The WinBook is a great example of what a Windows notebook should be....fast, easy-to-use and a miser on battery life....It's also inexpensive: nearly 50% less than some comparable notebooks."

WINDOWS MAGAZINE, Transcontinental Portable, 9/93

The WinBook Intel486 SX-25, DX-33 & DX2-50 SL Enhanced Features

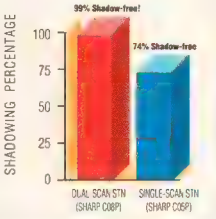


Ergonomically engineered & designed by award-winning Palo Alto Design

The WinBook's unique ergonomic features include a sloping wrist rest and keyboard with full-size keys, plus a centered, dual-button trackball—allowing you to work in total comfort away from your desk.

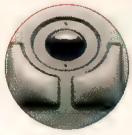
Clear, sharp color display gives you near-active matrix quality at a passive matrix price!

Images are sharper and clearer with less cursor loss. And the WinBook's advanced dual-scan color display gives you 99% shadow-free performance compared to other single-scan passive matrix displays. You get a brighter, crisper, wider angle of view with an 18:1 contrast ratio—compared to 13:1 with previous passive matrix technology.



Longer battery life

The WinBook features NiMH 2200 MA batteries with gold-plated contacts, allowing it to run much longer than units with traditional NiCAD batteries—and there's no memory effect!



The WinBook offers you more features for less!

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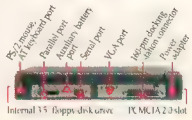

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SX & DX Specifications

Size/Weight
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- SX monochrome: 5.4 lbs. with battery
- SX and DX dual-scan color: 5.9 lbs. with battery

Pointing Device
- 16mm Alps dual-action, Microsoft-compatible trackball

Battery
- SX-25: up to 3 hours with power management; over 5 hours with auxiliary power system (less 30 minutes for color)
- DX-33: over 2 hours with power management; up to 5 hours with auxiliary power system
- NiMH (no memory effect)
- World wide auto-sensing AC adapter

Processor and Memory
- SL enhanced Intel486 SX 25MHz, DX 33MHz or DX2-50MHz CPU
- 4MB RAM (upgradable to 32MB)
- Pico Power Evergreen HV chipset
- 8k internal cache

Drives
- 1, built-in 1.44MB 3.5" floppy drive
- Internal 200MB (16ms) hard drive

Software
- Comes loaded with MS-DOS and Microsoft Windows

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- 640x480 resolution
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Panasonic CF-1000A
Suggested retail price: $1,999
Warranty: one year, parts

PANASONIC COMMUNICATIONS & SYSTEMS
(800) 742-8086

PANASONIC CF-1000A

Although heavier than the other units in this roundup, the CF-1000A offers a very good display and an internal floppy drive.

According to Panasonic, the CF-1000A weighs a mere five pounds, but on our scales, it weighs just over that. It's the heaviest notebook in the group.

It's also the only subnotebook we tested that has an internal floppy drive. You can remove the floppy drive, however, and replace it with a second battery if you need extra battery life more than access to a floppy.

DOS and Windows disks don't ship with the machine, but you can easily build the disks. This is one of the steps in the Getting Started section of the User's Guide.

The CF-1000A boasts the largest display in the group. This side-lit LCD has 64 levels of gray, and I found it bright and easy to read—a real advantage if readability is an issue for you.

This notebook is the thinnest we tested. I found the Panasonic keyboard easier to use for an extended period than the keyboards on some of the other computers. While the unit doesn't come with a built-in pointing device, there is a PS/2-style mouse port.

The unit comes with 4MB memory standard, expandable to either 8MB or 12MB. To expand the capabilities of the system, you use an optional docking unit which can hold two AT expansion boards (one long card and one short card or two short cards). The docking unit is an alternative way of adding memory, a LAN adapter, or additional ports for desktop use with standard peripherals.

The notebook's setup utility includes a power management menu that allows you to set power consumption settings for a dozen options. There are four groups of settings: default, long-life, super-long-life, and high-performance. We used the super-long-life setting for our battery-life test and the high-performance setting for the performance test.

The CF-1000A is an excellent choice if weight isn't much of a factor for you and if you'd like the readability of a larger display and the convenience of a built-in floppy drive.

Circle Reader Service Number 374

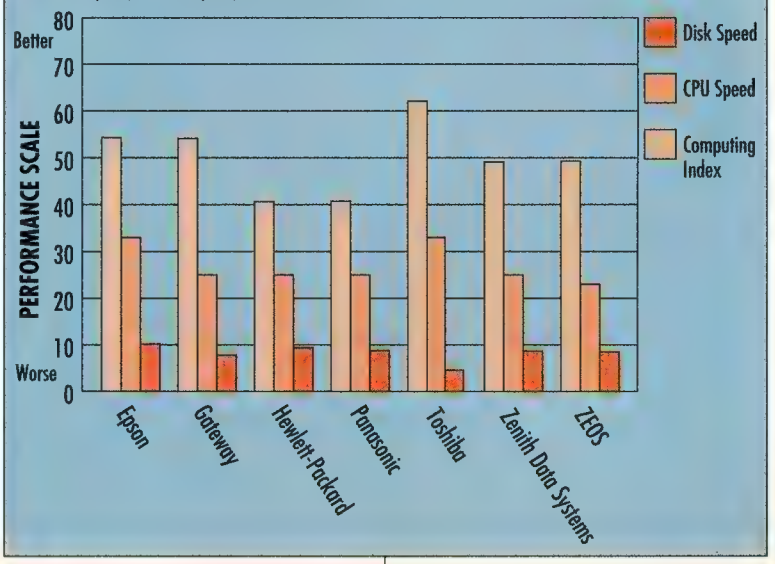
TOSHIBA PORTÉGÉ T3400

The unit we tested, model T3400, is a sales sample, which is not quite a production unit but close to it. Normally, we test only production units, but we felt it important to cover this one. As it turns out, the Portégé was the fastest both in our performance test and in the Norton SysInfo performance measurement. It also had the second-longest battery life.

The design of the keyboard includes some ergonomic considerations. The keyboard itself is positioned as far back as possible, which allows for a flat area on which to rest your palms. Also, there are feet that fold out to elevate the back of the unit and make for a more natural typing an-

NORTON BENCHMARKS

The Norton Utilities 6.0 served as an overall "window" for viewing the system's configuration, interrupts, and memory addresses. This group of utilities also provided a generic performance baseline, consisting of the CPU speed, the disk speed, and an overall index.



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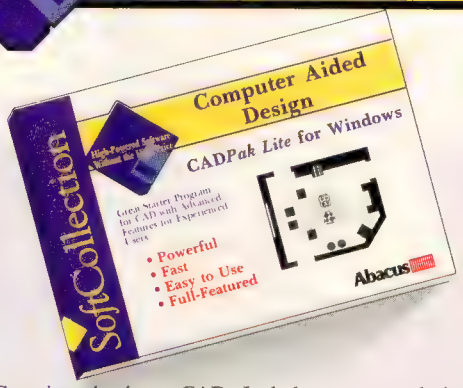

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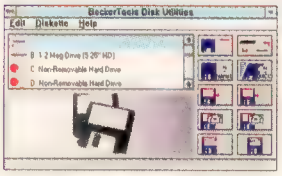

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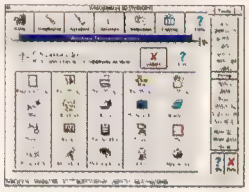

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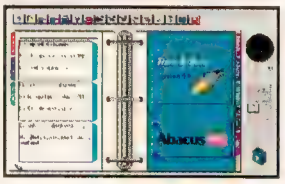

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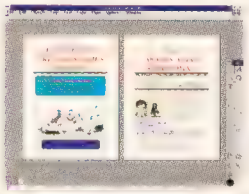

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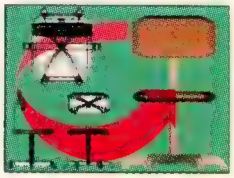

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gle. While the keyboard is more comfortable to use than most, the keys seem a little crowded, and the space bar is positioned too low for a typical touch-typist.

The pointing device on this unit, the AccuPoint, does a better job than other devices of accommodating both left- and right-handed people, as both the pointing device and the associated buttons are centrally located. However, I found it to be one of the more difficult pointing devices to use.

Bundled software includes DOS 6, Windows 3.1, UltraFont, CommWorks for Windows, and advanced power management software. The default Windows color scheme on this unit uses white characters on a dark background. To me, this is a little harder to read than dark characters on a light background, the scheme used by most of the other units. This is one of the two subnotebooks in our roundup with local-bus video.

As impressive as the performance numbers were, the Norton SysInfo report did show that the disk speed was the lowest, both in overall disk speed and in the data transfer rate. Since our tests involved a fair amount of disk activity, the rest of the system design seems to have adequately compensated for this shortcoming.

This was the only unit with an optional port replicator containing serial, parallel, external video, PS/2 mouse, and PS/2 keyboard ports. These ports offer easy, one-touch connection with the desktop environment. A Type II PCMCIA slot extends the Portégé's capabilities even further.

With the performance this machine offers, it's an excellent candidate for the person who wants to use the same unit both for travel and on the desktop with some full-size peripherals.

Circle Reader Service Number 375

Toshiba Portégé T3400
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ZENITH DATA SYSTEMS Z-LITE 425L

Of all the subnotebooks we tested for battery life, the Z-Lite had the longest life, and it also fared well in the application performance test.

The design of this unit is sleek, with the back slightly thicker than the front (which certainly gives it more of a notebook appearance). Also, the AC adapter connects directly to the external floppy drive, which in turn connects to the left side of the computer, giving the AC adapter and floppy drive the appearance of a single unit. The pointing device, called the LITEPOINT, is a separate (and optional) unit that connects directly into the front of the computer, also giving this portion of the system the appearance of a single unit.

The benefit of the LITEPOINT design is that it provides a partial palm rest when using the keyboard for an extended period of time. The keyboard is positioned at a 3.5-degree slope, which also benefits keyboard users.

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Lightest (without power supply)	Gateway 2000 HandBook 486SX-25 and HP OmniBook 425
Lightest (with power supply)	HP OmniBook 425
Fastest	Toshiba Portégé T3400
Fastest of 25-MHz machines	ZDS Z-Lite 425L
Longest battery life	ZDS Z-Lite 425L
Shortest recharge time	Panasonic CF-1000A
Best display (subjective)	Panasonic CF-1000A
Largest display	Panasonic CF-1000A
Best keyboard (subjective)	HP OmniBook 425
Best pointing device (subjective)	HP OmniBook 425
Most ready to run	HP OmniBook 425
Fastest disk speed	Epson ActionNote 4000
Most PCMCIA slots	ZDS Z-Lite 425L and hard disk version of HP OmniBook 425

While the ZEOS Contenda did not capture any of the above categories, it was close to the best in several categories: almost the smallest, almost the fastest of 25-MHz machines, almost the longest battery life, one of the two with local-bus video, and one of the two with 64 gray scale.

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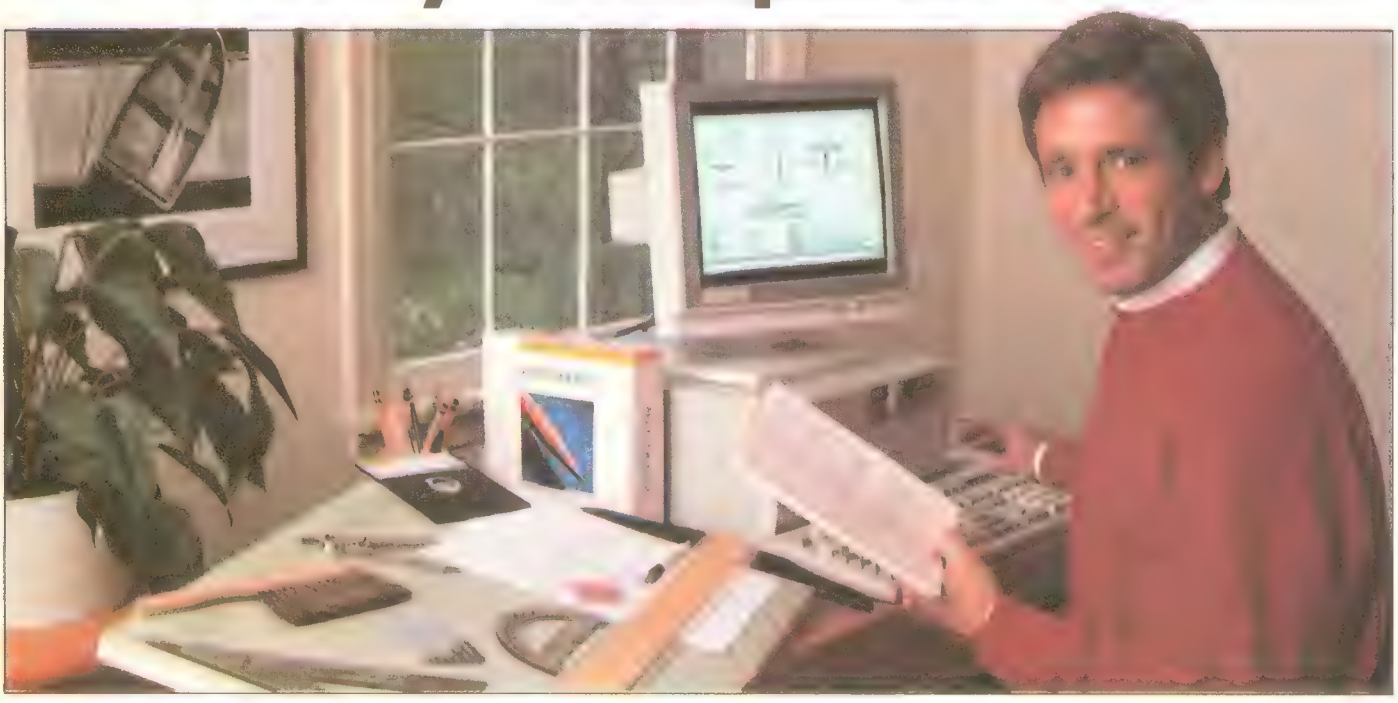

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Software shipped with this unit includes DOS 6, Windows 3.1, and PCMCIA card and socket services.

The unit includes two PCMCIA slots, which allow it to be configured with both a modem and a LAN adapter for ultimate flexibility.

Interfaces available include one serial port, one Enhanced Parallel Port (which can perform high-speed bidirectional transfer of data), a mouse/keypad/keyboard port, and an SVGA-compatible video port (which can be used for simultaneous display).

The Z-Lite has a full-size 8½-inch black-on-white VGA display

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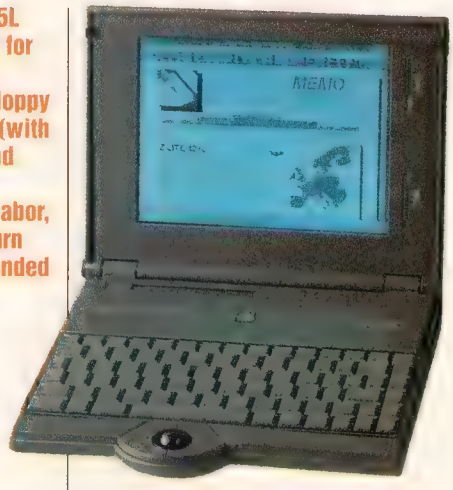


TEST METHODOLOGY

The tests for the seven subnotebooks in this month's Test Lab include The Norton Utilities 7.0 benchmarks and a suite of application and battery-life tests specially developed for this roundup.

We chose The Norton Utilities benchmarks of CPU speed, hard disk speed, and overall performance because they are familiar to COMPUTE's readers and have been used extensively in past Test Lab roundups.

The specially developed application and battery-life benchmarks, on the other hand, reflect more in the way of real-world performance.

We came up with comparative performance numbers using a suite of Windows application tests scripted using Wilson WindowWare's WinBatch. The scripts were played back with all power management features disabled. The first and last actions in this suite involved saving a time stamp to a Notepad time log. We attempted to use the Windows Recorder for the battery-life test suite, since it has an option to play back a macro at recorded speed. Unfortunately, difficulties encountered with Recorder macros and advanced power management on some notebooks forced us to switch to a WinBatch script (with frequent short delays to simulate user keystrokes) to capture battery-life numbers. The script ran in a continuous loop with all power management features enabled.

In the battery-life test suite, a time stamp was logged every time an application was launched. The maximum margin of error was four minutes (the longest time between time stamps). It should be noted that since our test script opened and closed applications frequently and wrote to a log file frequently, users should expect at least as much battery life as in our test results.

The test suite included word processor, spreadsheet, and database tests using Windows applications likely to be favorites of the hobbyist and small-business user. Prior to executing the tests, we reformatted the hard disk of each machine (except the OmniBook) and installed DOS 6. Then The Norton Utilities 7.0, Windows 3.1, and the remaining applications were installed. The directory structure and the number of files on each machine were identical with the exception of any machine-specific drivers which needed to be loaded.

The word processor performance testing included line-by-line scrolling, font changes, word searching, spell-checking, and print preview of a six-page test document containing a bordered table with five columns and 33 rows, a section with three newspaper columns, an imported graphic, special characters, and text in point sizes ranging from very small to very large.

The spreadsheet test file was a ten-year amortization table, and the performance test steps included scrolling through the table to select a portion to be highlighted with a pattern, changing the typeface for a portion of the table, recalculating the monthly payments for a changed loan amount at a different interest rate, and print-previewing the table.

The database file was 1.4MB and contained eight tables, 24 forms, and 23 reports. The database performance test included performing a query, adding a record, print-previewing all the pages in a report, and browsing all the records in a table where the form contained a picture field. Because of the size of this test file and the complexity of most of the displays in this test, this portion of the test suite required the most time to execute.

The OmniBook from Hewlett-Packard has special design features to prolong battery life and maximize memory and storage. For example, special versions of Microsoft Excel 4.0 and Word for Windows 2.0 are stored in ROM. We were not able to use our regular suite of tests on this unit; however, we did design a special suite of tests using the OmniBook's own applications so that we could offer results that, though not directly comparable to the results of the other tests, still offer some sense of performance and battery life. So as you look at the bar graphs representing the results of these tests, please keep these differences in mind.

that is backlit. Separate controls adjust contrast and brightness.

A panel of icons above the keyboard displays the status of the power source, hard drive activity, floppy drive activity, PCMCIA activity, the battery-life gauge, and so forth.

The Z-Lite comes standard with 4MB of RAM, which you can expand to 20MB with a 16MB memory module.

There are three hard drive sizes available, the largest of which is 170MB.

The Z-Lite will especially appeal to users for whom long battery life is a key concern but who don't want to make any compromises in performance.

Circle Reader Service Number 376

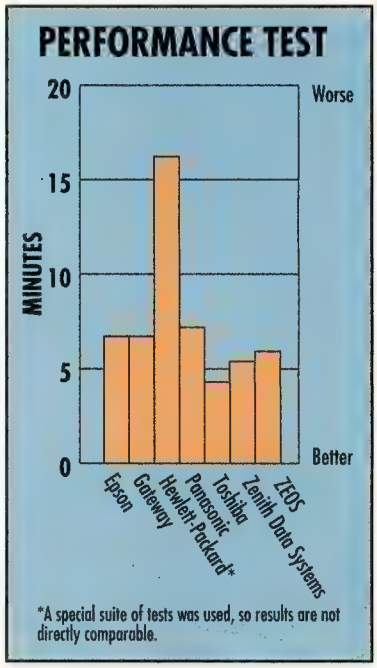
ZEOS CONTENDA

The Contenda is a lot of computer in under four pounds. Test results showed both good battery life and good performance. And in this Test Lab roundup of subnotebooks, it's one of the two machines featuring local-bus video for Windows acceleration.

The unit supports simultaneous display of its own screen and an external SVGA color monitor. An optional full-size keyboard is available, which you plug into the parallel port. Software packaged with the unit we tested includes DOS 6, Windows 3.1, Lotus Notes, and advanced power management software. The advanced power management software runs under both DOS and Windows. Battery-life tests were performed with the maximum power conservation setting.

One particularly useful utility that comes with the Contenda allows you to use an optional big cursor, which is a lot easier to keep track of when performing operations with the pointing device. This is one of the two units in our test without any PCMCIA slots, but the unit does include an internal fax/data modem slot.

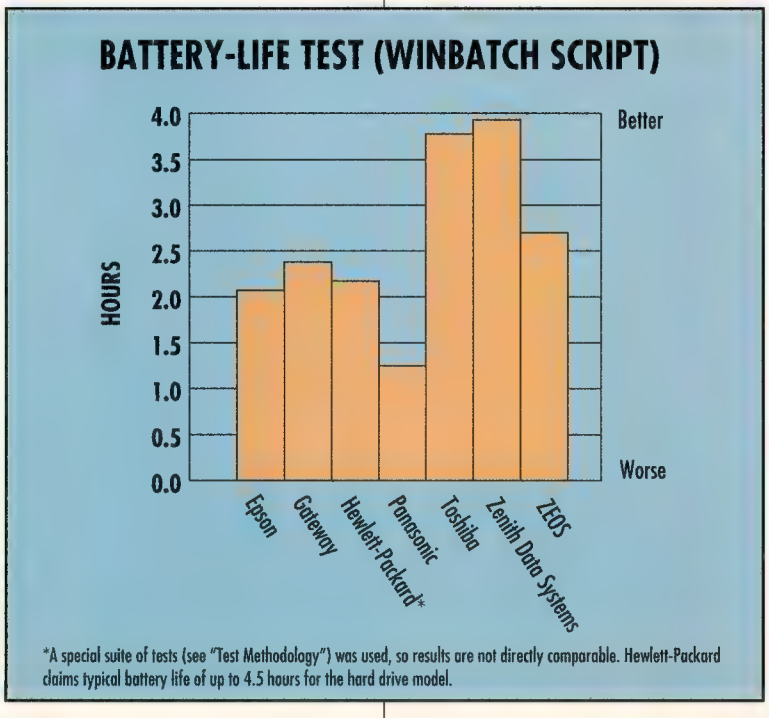
The backlit display is crisp and bright, although the 7.4-inch (diagonally measured) screen is the smallest in the group. Brightness and contrast adjustments are software based (made with function key combinations) rather than hardware controlled.



As with some of the other units, this one has a keyboard that I feel sits too high above the work surface—at least an inch. You turn this unit on and off with keypresses rather than a switch. While we were working with the machine, the keyboard and trackball became inactive. As a result, we couldn't warm- or cold-boot the system (Ctrl-Alt-Delete didn't work, and we couldn't turn the power off because doing so requires a keypress). We had to wait until we lost battery power and then reboot.

The trackball on this unit is placed just above and to the right of the keyboard—not an ideal placement for a left-handed user.

The computer has an optional DC-DC adapter that plugs into



Performance testing was conducted by Benchmark Laboratories, Incorporated. BLI is an independent testing and evaluation laboratory based in Minneapolis, Minnesota. Every effort has been made to ensure the accuracy and completeness of this data as of the date of testing. Performance may vary among samples.

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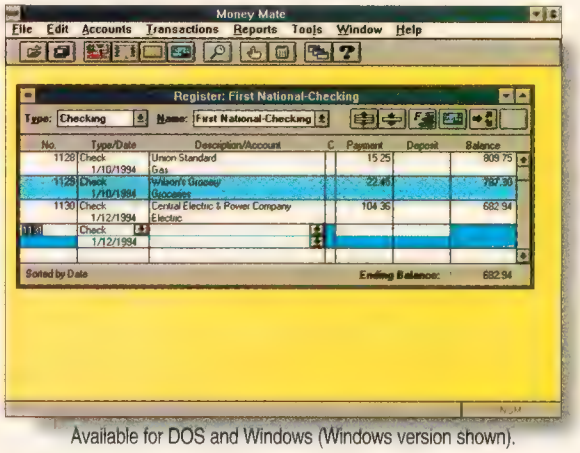
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GLOSSARY

AC adapter. The power supply for portable computers that converts AC (Alternating Current—the type of current available in wall outlets) to DC (Direct Current—the type of current available in the rechargeable battery packs used in portable computers), which is the type of power required by the computers. The battery pack is being charged when you supply power to the computer with this adapter.

active matrix. Whereas on a monochrome display, every dot is a pixel, on an active matrix display, three pixels—red, green, and blue—are required to form a single dot as perceived by the eye. Each pixel has its own transistor. Active matrix displays produce vibrant, fully saturated contrasts, and it's easier to view an active matrix display from wide viewing angles than it is to view a monochrome or passive matrix display.

backlit. A backlit LCD screen provides its own light source from the back of the screen. This makes the background brighter and the characters sharper.

docking station. An external expansion chassis that attaches to a notebook computer and can provide adapter slots, drive bays, and ports for attaching an external monitor, a keyboard, and a mouse. A docking station provides access to desktop peripherals and could allow you to use just one computer—the notebook—on the desktop and on the road.

expansion box. A unit that can be attached to a notebook computer. It provides slots for additional cards.

flash disk. A plug-in card used for storing data. It requires no power to maintain its data. Typical capacity ranges from 5MB to 20MB.

gray scale. Shades of gray used to display or record information with more gradations than just black and white. Also represents colors as various shades of gray. The number of shades represented by an LCD screen depends on the design of the video display electronics.

LCD. Liquid Crystal Display. A type of video display unit involving a liquid crystal medium introduced into a finely partitioned glass, with electrodes connected to each partition. When voltage is applied differentially to the electrodes, the liquid crystal changes its brightness, allowing the formation of characters and other patterns.

local-bus video. A video adapter that connects directly to the microprocessor. With local-bus video, information moves at a much greater speed than through a traditional bus.

nicad. Nickel-cadmium. A rechargeable battery storage medium.

NiMH. Nickel metal hydride. A rechargeable battery storage medium.

passive matrix. Each column or row of pixels in a passive matrix display uses three transistors to control the red, green, and blue signals. Passive matrix displays produce slower refresh rates and narrower viewing angles than active matrix displays.

PCMCIA. Personal Computer Memory Card International Association. An industry standard for credit card–size expansion cards that plug into special sockets. The height of one of these devices can range from 3.3 mm to 10.5 mm.

port replicator. A unit which can be attached to a notebook computer to provide additional ports not available on the notebook itself.

power management. A common feature in portable computers that conserves battery life by temporarily shutting down system components such as the hard drive and the display.

ROM. Read-Only Memory. A type of memory device that usually is used to store system BIOS code. This code cannot be altered and is not lost when the computer is powered off. On some notebooks, complete applications are stored in ROM.

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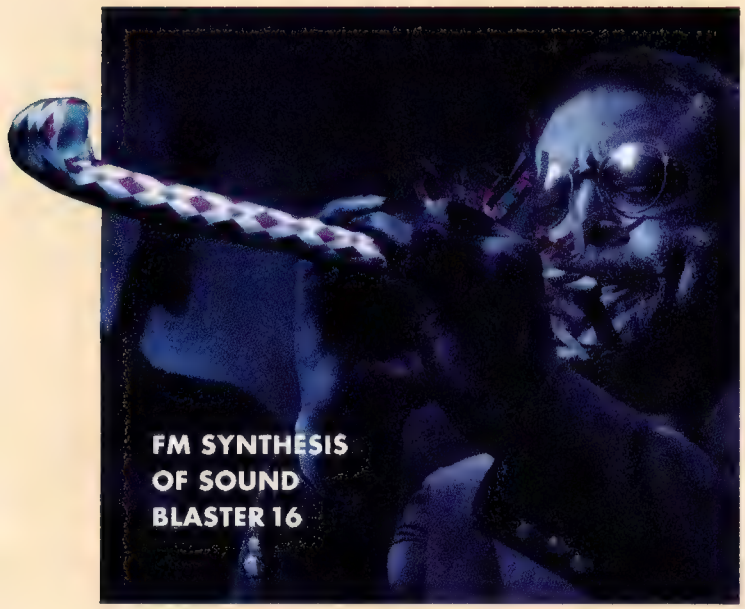

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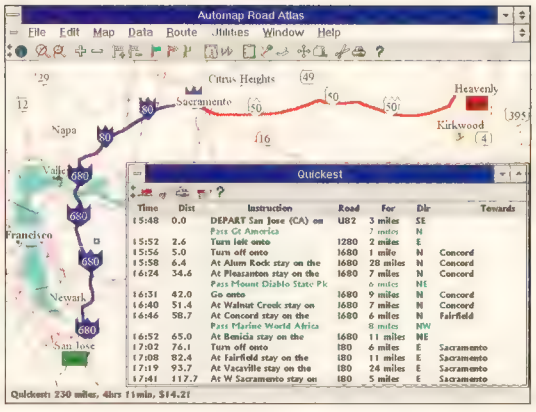
TEST LAB

SUBNOTEBOOK FEATURES[1]

	Epson	Gateway	Hewlett-Packard	Panasonic	Toshiba	Zenith Data Systems	ZEOS
Weight of notebook (in pounds)[2]	3.85	2.94	2.94	5.1	4.1	3.9	3.9
Weight of power supply (in pounds)[3]	0.912	0.962	0.65	0.73	0.53	0.738	0.656
Dimensions (in inches)	10 x 7.6 x 1.5	9.75 x 5.9 x 1.6	11.1 x 6.4 x 1.4	11.7 x 9.3 x 1.25	9.9 x 7.9 x 1.7	9.9 x 7.6 x 1.54	9.7 x 6.1 x 1.8
Microprocessor manufacturer	Cyrix	Intel	Texas Instruments	Cyrix	Intel	Intel	Intel
Microprocessor name	486SLC	486SX (SL enhanced)	486SLC/e	486SLC/e	486SX (SL enhanced)	486SL	486SL
Speed (in MHz)	33	25	25	25	33	25	25
Display size (diagonally, in inches)	7.5	7.9	9	9.4	8.4	8.5	7.4
Monochrome display capability	640 x 480 x 64 gray scale	640 x 480	640 x 480 x 16 gray scale	640 x 480 x 16 gray scale	640 x 480 x 16 gray scale	640 x 480 x 16 gray scale	640 x 480 x 64 gray scale
Screen lighting	backlit	backlit	reflective	sidelit	backlit	backlit	backlit
Local-bus video	no	no	no	no	yes	no	yes
Simultaneous video display	yes	yes[4]	no	yes	yes, via port replicator	yes	yes
Hard drive sizes (in MB)	80,120	80	10 (flash disk), 40 (hard disk)	80,170	120	85, 120, 170	80,120
Removable hard drive	yes	no	no	no	no	no	no
Maximum RAM (in MB)	8	20	8	12	20	20	8
Pointing device	built-in two-button trackball	built-in two-button joystick	built-in pop-up mouse	external PS/2-style mouse port	built-in two-button AccuPoint	optional two-button LITEPOINT	built-in two-button trackball
1.44 floppy drive	yes	optional	optional	yes[5]	yes	optional	optional
Floppy drive location	external	external	external	internal	external	external	external
PCMCIA slots	one Type II	one Type II	one Type II[6]	none	one Type II	one Type II	none
Proprietary modem slot	no	no	yes	yes	no	no	yes
Parallel ports	one	one	one	one	one	one	one
Serial ports	one	one	one	one	one	one	one
External keyboard/ mouse port	one PS/2 port for either keyboard or mouse	one PS/2 port for either keyboard or mouse	no	one PS/2 port for either keyboard or mouse	via port replicator	one PS/2 port for either keyboard or mouse	no (optional Genovation parallel-port keyboard is available)
Battery type	nicad	NiMH	NiMH	NiMH	Lithium-Ion	NiMH	NiMH
Time to recharge (in hours)	1.5 (off), up to 6 (on)	2	less than 2	1.25 (off), 2 (on)	3 (off), 8 to 10 (on)	2.5	1.5 to 2 (quick charge)
Port replicator option	no	no	no	no	yes	no	no
Docking station option	no	no	no	yes	no	no	no
Expansion box option	no	no	no	no	no	no	no

[1] All information in this chart was obtained from the documentation provided by each manufacturer.
[2] With battery and hard disk installed.
[3] Does not include weight of power cord.
[4] Through optional PCMCIA adapter.
[5] Can be removed for second battery.
[6] For hard disk model; two Type II for flash disk model.

vs.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Citrus Heights
Sacramento
Heavenly
Napa
Kirkwood
Valle
Francisco
Newark
San Jose
Quickest
Time Dist Instruction Road For Dir Towards
15:48 0.0 DEPART San Jose (CA) on US2 3 miles SE
Pass Gt America 7 miles N
15:52 2.6 Turn left onto I280 2 miles E
15:56 5.0 Turn off onto I680 1 mile N
15:58 6.4 At Alum Rock stay on the I680 28 miles N Concord
16:24 34.6 At Pleasanton stay on the I680 7 miles N Concord
Pass Mount Diablo State Pk 6 miles NE
16:31 42.0 Go onto I680 9 miles N Concord
16:40 51.4 At Walnut Creek stay on I680 7 miles N Concord
16:46 58.7 At Concord stay on the I680 6 miles N Fairfield
Pass Marine World Africa 8 miles NW
16:52 65.0 At Benicia stay on the I680 11 miles NE
17:02 76.1 Turn off onto I80 6 miles E Sacramento
17:08 82.4 At Fairfield stay on the I80 11 miles E Sacramento
17:19 93.7 At Vacaville stay on the I80 24 miles E Sacramento
17:41 117.7 At W Sacramento stay on I80 5 miles E Sacramento
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Circle Reader Service Number 137

PROGRAMMING POWER

Tom Campbell

VBASSIST 3.0: A VISUAL BASIC ADD-ON

I was going to finish my coverage of YACC this month, but a new version of VBAssist was brought to my attention, and it couldn't wait. We'll look more at YACC in an upcoming issue.

VBAssist is a Visual Basic add-on that isn't primarily a function library or a set of VBX files. Instead, VBAssist (from Sheridan Software Systems, 65 Maxess Road, Melville, New York 11747; 516-753-0985) merges almost seamlessly with the Visual Basic development environment, working so well that you begin to forget that Visual Basic wasn't like this to begin with.

If you use Visual Basic, VBAssist should probably be found in your bag of tricks.

The main visual difference when VBAssist is running is that a second toolbar with two rows of icons appears below the standard Visual Basic toolbar. But the differences go much deeper than that.

VBAssist comes with DB Assistant, the tool that Visual Basic Pro's Data Manager should have been; Data Assistant, which has a host of features to let you create and edit forms (in particular, a Form Wizard somewhat like the one in Access); a tool that generates a standard Windows resource file from a Visual Basic form, letting you use Visual Basic as a prototyping tool for C; a control alignment tool that lets you whip together groups of controls effortlessly; a set of ingenious tools for managing control arrays; a group of tools for managing control properties; and much more.

If you don't do a lot of work in Visual Basic, this sounds almost like a set of randomly chosen features—dialog resource generation along with database manipulation? But, in fact, what all these things have in common is that they directly address the day-to-day needs of the Visual Basic programmer. For example, if you've ever had to create a form or group of forms with a lot of controls, you might have found that it gets old fast. Invariably, the grid spacing, button size, and fonts you need to repeat many times bear no resemblance to the defaults Visual Basic provides. So you end up pointing and clicking all afternoon. VBAssist conquers problems like this handily by letting you create template controls and select groups of controls at one time and align them.

Another timesaver that became so much a part of my routine that I forgot it wasn't a part of Visual Basic is the property menu. Click on a control with the right mouse button, and a floating menu pops up right beside the control. This is hardly news to Smalltalk and Borland Paradox users, but it's a revelation for the rest of us. The property menu adheres to VBAssist's philosophy of dividing like properties into logical groupings, so if you right-click on a text field, you can then choose to view only its color properties, say, or its database properties. (You can also select All to list all properties, but Visual Basic already has the F4 key for that.) A property dialog then appears with only that set of properties shown. This system is so natural and intuitive that I expect to see it in the next release of Visual Basic. One thing I don't like about the VBAssist property windows is that they sport a half-size system menu icon in the upper left corner, just like "real" windows, but clicking on it does the same thing the Escape key does—simply causes the dialog to close. I'd much prefer it to act like a "real" system menu and allow the dialog to be minimized and maximized; some property lists are long enough that you have to resize the window manually or use the scroll bar. I'd rather just be able to maximize. It's also questionable user interface design to take a familiar-looking control and give it a whole new meaning.

I have a pet peeve about Visual Basic, Access, and all the other Windows visual development systems I can think of: The controls that allow you to display images typically require that you type in a filename for the ICO, BMP, or WMF image but never give you a convenient way to browse the images. VBAssist gives you a File Open dialog in its control property menu that lets you browse these images before plugging them into the form. I hadn't realized how badly I wanted this feature until I started up Visual Basic without VBAssist.

The least sexy and—to me—most useful features of VBAssist are its confusingly named DB Assistant and Data Assistant. DB Assistant lets you create and alter the structure of database tables; astoundingly, not even Visual Basic Pro's feeble Data Manager lets you change the structure of a table. Data Assistant has a ton of features to make form design easier, but the coolest is Form Wizard, which takes a raw table structure and automatically designs a data entry form around it. Form Wizard is familiar to Access users but not to Visual Basic users, and VBAssist's other form design features together make Visual Basic a much better form-building system than Access.

If you use Visual Basic more than occasionally, VBAssist should probably be found in your bag of tricks. At $100 it's well priced, well documented, and superbly designed for the Visual Basic programmer. ❐

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TIPS & TOOLS

Edited by Richard C. Leinecker

Check out those disk drives, and convert ASCII comma-delimited database files to tab-delimited files.

Check That Drive

You've just completed the best batch file in the world. It does all kinds of stuff to the floppy drives. But if there's no disk in the drive, your batch file fails, and the user gets the famous *Abort, Retry, Fail?* message. The same thing happens if the disk in the floppy drive isn't formatted.

There is a solution: a small program called DRIVEOK.COM. It checks to see if the disk and drive are OK. If the disk isn't formatted or the drive door is open, the Driveok program returns a nonzero errorlevel. Otherwise, it returns an errorlevel of 0.

You can use the program from the command line or a batch file. Type *driveok a* to check drive A, *driveok b* to check drive B, or *driveok* to check both drives. If only drive A shows an error, you'll get an errorlevel of 1. If only drive B shows an error, you'll get an errorlevel of 2. If both drives show errors, you'll get an errorlevel of 3.

You can type in Driveok using the DOS Debug command. Make sure the DOS program called Debug is in your path or the current directory. In these examples, the italic text is what the computer prints; the roman text is what you should type. One way to be sure you get these programs exactly right is to have someone read the numbers to you as you type them in. Another way suggested by one of our readers is to read the numbers into a tape recorder and then play them back as you enter the program code.

```
debug driveok.com
File not found
-e 100 BD 03 00 BE 80 00 AC 0A
-e 108 C0 74 1B AC 3C 0D 74 16
-e 110 3C 20 74 F7 24 DF 3C 41
-e 118 75 05 BD 01 00 EB 07 3C
-e 120 42 75 03 BD 02 00 B4 19
-e 128 CD 21 2E A2 8B 01 B8 24
-e 130 25 BA 8F 01 CD 21 F7 C5
-e 138 01 00 74 1A B4 0E 2A D2
-e 140 CD 21 BA 8D 01 B8 00 43
-e 148 CD 21 80 3E 8A 01 00 74
-e 150 05 C6 06 8C 01 01 C6 06
-e 158 8A 01 00 F7 C5 02 00 74
-e 160 1A B4 0E B2 01 CD 21 BA
-e 168 8D 01 B8 00 43 CD 21 80
-e 170 3E 8A 01 00 74 05 80 0E
-e 178 8C 01 02 8A 16 8B 01 B4
-e 180 0E CD 21 A0 8C 01 B4 4C
-e 188 CD 21 00 00 00 24 00 2E
-e 190 C6 06 8A 01 01 2B C0 CF
-RCX
CX 0000
:0098
-W
Writing 0098 bytes
-Q
```

The checksum value is 13229 (the Checksum program was published in the July 1993 "Tips & Tools" and is available in COMPUTE's area on America Online).

Here's how to use the program in a batch file (the name of this batch file is CHKDRV.BAT).

```
@ECHO OFF
REM The batch file expects you
REM to type a drive specifier
REM for testing specific drives
REM or no command line
REM argument to test both drives.

DRIVEOK %1
IF ERRORLEVEL 3 GOTO L3
IF ERRORLEVEL 2 GOTO L2
IF ERRORLEVEL 1 GOTO L1
ECHO No disk errors appeared
ECHO using the Driveok
ECHO program.
GOTO END

:L1
ECHO Drive A has a serious disk
ECHO error.
GOTO END

:L2
ECHO Drive B has a serious disk
ECHO error.
GOTO END

:L3
ECHO Drives A and B have serious
ECHO disk errors.
:END
```

RICHARD C. LEINECKER
REIDSVILLE, NC

Better PFS File Conversion

Clark Harper's tip for converting his PFS First Choice files to Works ("Tips & Tools," October 1993) assumes that none of his records have any commas in them.

The PFS files can be stored as ASCII comma-delimited text. Since fields themselves might contain commas, quotation marks are used to enclose the fields. Commas inside pairs of quotation marks are treated as text and printed or stored. Commas between fields act as delimiters.

To prevent replacing commas in the middle of text fields with tab characters, Harper's code should be modified to the following listing. (An indented line is a continuation of the preceding line.)

```
OPEN "infile" FOR INPUT AS #1
OPEN "outfile" FOR OUTPUT
  AS #2
DIM InsideQuotes, True, False AS
  INTEGER
False = 0
True = NOT False
InsideQuotes = False
' Flag is set True when we're
' inside a set of quotation marks.
DO WHILE NOT EOF(1)
CHARACTER$ = INPUT$(1, #1)
IF CHARACTER$ = CHR$(34)
  THEN
IF NOT InsideQuotes THEN
' We weren't inside a set of
' quotation marks, but now we are,
' so set the flag.
InsideQuotes = True
ELSE
' We were inside a set of quotation
' marks, but we aren't anymore,
' so unset the flag.
InsideQuotes = False
END IF
CHARACTER$ = ""
END IF
```

```
IF (CHARACTER$ = CHR$(44))
 AND NOT InsideQuotes THEN
CHARACTER$ = CHR$(9)
END IF
PRINT #2, CHARACTER$;
LOOP
PRINT #2, ""
CLOSE
END
```

NOEL NYMAN
SEATTLE, WA

Getting WP Tables Straight

In DOS and Windows, the WordPerfect 5.1 table function is a great improvement over tabbed columns, and converting from tabs to formatted tables is a snap.

Start by blocking the tabbed columns. Next, select Table Create (DOS: Alt-F7, Windows: Ctrl-F9, Create). Then select Create Table from Tabbed Column.

Remember that WordPerfect converts every tab into a column and every hard return into a row. To create symmetrical tables from tabbed columns, be sure that every row has the same number of tabs and that tabbed columns align vertically. (Fill in short rows with empty tabs.) To keep tables compact, separate rows by a single hard return. (Extra hard returns turn into empty, single-celled rows.)

WILLIAM J. WOLFE
CHAMPAIGN, IL

Printing on Both Sides

While printing long documents, I like to save paper by printing on both sides. I have an ordinary 9-pin printer, so this involves printing half of the pages on one side of continuous paper, removing the printed pages, turning them over, and feeding them again to print out the other half. While this is a bit cumbersome, the real problem is that the pages are printed out of order. This problem can be solved by printing the odd-numbered pages on one side of the paper and the even-numbered ones on the other.

I wrote a macro for Microsoft Word which allows me to print odd- and even-numbered pages. (An indented line is a continuation of the preceding line.)

```
<Shift Ctrl Esc>Up<Enter>
«MESSAGE»
«SET ECHO="OFF"»
<Ctrl End>
«SET choice=0»
«WHILE choice <>1 AND
 choice<>2»
«ASK choice =?1.odd or 2.even»
«ENDWHILE»
«SET maxpage=Page»
«Set count=choice»
«WHILE count<=maxpage»
«SET ECHO="ON"»
«MESSAGE Printing page «count»
 of «maxpage»»
«SET ECHO="OFF"»
<Shift Ctrl Esc>fp
<Alt S>«count»
<Alt A>p
<Enter>
«SET count=count+2»
«ENDWHILE»
```

When you run the macro, you're asked if you want to print odd- or even-numbered pages. First, type 1 for odd and press Enter. After the printing has stopped, tear off the last page, being careful not to separate any other printed pages at the perforations. Then reinsert the paper so that the first printed page is toward you and facing up. Run the macro again; this time, choose even-numbered pages.

While doing this, you might want to set the mirror margins option so that the printed pages can be bound easily in a book form.

FARID AHMAD
ISLAMABAD, PAKISTAN

Instruction Instructions

I have a tip for people who have this same problem. Almost every time I get a new software package, there is an instruction manual to deal with. I have found the following procedure to be a great timesaver.

Obtain a small, 3½- × 5-inch, spiral notepad or a spiral-bound deck of index cards. Make sure it will lie flat on the desk.

Allow three or more blank pages at the start for an index. Start reading the manual and make notes of those items which concern you. When you make notes on the pad, make sure you include the topic and page number from the printed manual.

On each notepad page, write down headings and brief instructions on the topic from the manual. The first section should be how to start the program.

If the instructions for any section are long, just write down the page number in the manual where you can find complete instructions.

The second section should be how to quit the program; that's the thing you'll probably need after you know how to start.

Other important topics that you should include in your personal manual are how to load, print, and save files, and the meaning of error messages.

ROBERT MATHIAS
BROOKFIELD, IL

A WordPerfect technique for creating quick tables, a Word macro for double-sided printing, and an idea for writing your own quick-start manuals

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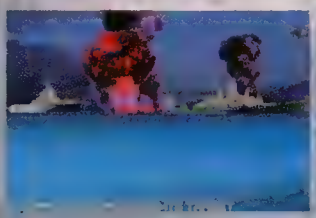

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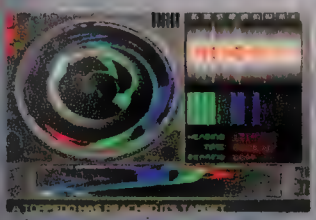

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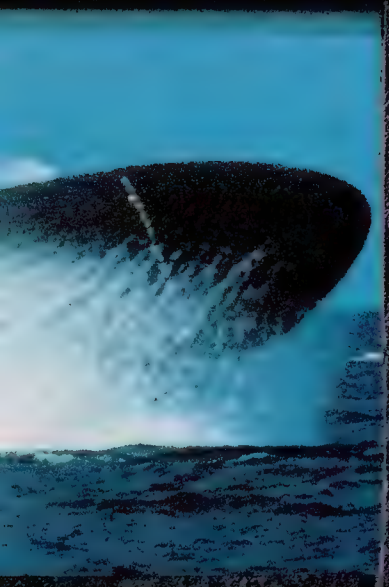

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ELECTRONIC ARTS

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HARDWARE CLINIC

Mark Minasi

THE CONTINUING SAGA OF SCSI

Last month, we started looking at the techniques necessary to get a PC up and running with SCSI peripherals. Although I said last month that I'd cover active termination in this month's column, space considerations have forced me to move that topic to next month's column. This month, we'll look at the next two steps: setting SCSI IDs and installing peripherals.

SCSI IDs and parity keep communication on the SCSI chain unambiguous and error-free.

Each device in a SCSI system must have a unique identification number called a SCSI ID. The values for this ID range from 0 to 7, and as the numbers must be unique, the SCSI system generally won't work if you attach more than one peripheral that uses the same ID. Typically, the host adapter is set to 7. You can change the host ID, but don't. Changing the host ID will unnecessarily expose you to software incompatibilities.

Before installing a peripheral in your system, you should assign it a SCSI ID (usually with a DIP switch, a jumper, a thumbwheel, or the like). There are just a few rules for setting SCSI IDs.

Rule 1: Each device on the SCSI chain must have a unique ID. Putting two SCSI devices on the chain with the same SCSI ID number will prevent both devices from working and could keep other SCSI devices from working.

Rule 2: Don't use ID 0 or ID 1 for anything but hard disks. Much SCSI hardware assumes that anything at ID 0 or 1 is a hard disk. In a pinch, it's OK to assign ID 1 to something other than a hard disk drive, but never assign ID 0 to anything but a hard disk unless you've got a PS/2 (we'll get to PS/2s shortly).

Rule 3: If you plan to boot from a SCSI hard disk, make it ID 0. The BIOS on your SCSI host adapter will expect a boot device to have SCSI ID 0 (except for PS/2s, as I'll explain in a minute). This doesn't mean that you must boot from a SCSI device if you have a SCSI host adapter, however. A number of computers in my office boot from IDE hard disks and then use SCSI host adapters to access CD-ROM drives. But any SCSI boot device must be at ID 0.

Rule 4: Check the documentation for your operating system to see if it expects a device at a particular ID. For example, my advice to put a hard disk on ID 0 or 1 is really DOS-, OS/2-, and NT-based advice. Other operating systems (SCO UNIX, for example) may not care which ID you use for a boot drive. At the same time, SCO must see any CD-ROM drives at ID 5. Sometimes the only way to solve a SCSI problem is to try out different ID combinations until something works. I've never fixed anything by fiddling around with the host adapter's ID, but I've fixed things by twiddling the peripheral IDs.

Rule 5: IBM PS/2 machines with SCSI drives use ID 6 for bootable hard disks.

If some of what I've said sounds vague, it's because SCSI is still evolving.

Keeping track of SCSI IDs isn't as hard as it sounds. One of the really nifty things about SCSI is that SCSI devices will tell you about themselves if asked. When your system powers up, your SCSI host adapter says to the other SCSI devices, "Identify yourselves!" For example, on a system that I own with a SCSI host adapter and an NEC CDR-84 CD-ROM drive, I see a message on boot-up that says *Host Adapter #0 - SCSI ID 6 - LUN 0: NEC CD-ROM DRIVE: 841 1.0.* This tells me that on host adapter number 0—it's possible to have more than one host adapter—there is a device with SCSI ID 6. Sometimes, you'll see a message that refers to a target SCSI ID. Target SCSI ID is the same thing as SCSI ID. So when you see *target,* ignore it. Don't worry about *LUN;* I'll explain that in a minute. The device is built by NEC, and it's a CD-ROM drive. The specifics of its software indicate that it is the NEC 84 CD-ROM drive, version 1.0. That identifying information makes it easier for software to automatically configure new hardware. For example, when I install a program like Adaptec's EZ-SCSI or Corel's CorelSCSI!, I needn't tell the program that I have a CD-ROM drive on SCSI ID 6—it reads that information right off the drive.

If it's not obvious how useful this is, consider what's involved in the installation of a standard IDE hard disk drive nowadays. In order to get the PC to recognize the drive, you have to tell the PC how many cylinders the drive has, how many heads it has, and how many sectors are on each track on the disk. Why can't the drive tell the PC? Or how about the ordeal of installing printer drivers for every new piece of DOS software? It's silly that when I install Windows or OS/2 on a system, the installation program eventually asks me, "What kind of printer do you have?" That's something that a computer and a printer ought to be able to work out between themselves. But they can't, because of the the interface between IDE hard disks and PCs and between printers and PCs.

Now let's get to that message that included *LUN 0. LUN (Logical Unit Number)* refers to the fact that a SCSI device can have subdevices. Let's take an example. A com-

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Circle Reader Service Number 133

pany by the name of Iomega makes a cartridge backup device called the Bernoulli Box. One of its offerings is the Iomega 44+44 Bernoulli backup device. It's a metal case containing two 44MB cartridge drives, and it's SCSI compatible. If I connect an Iomega 44+44 cartridge device to one of my SCSI systems, then I'll see a new SCSI ID, which refers to the 44+44 system. The two 44MB cartridge drives will be distinguished not by different SCSI IDs but by different LUNs under the same SCSI ID.

SCSI parity adds a little redundancy, which makes it easier to spot bad transmissions.

This situation is fairly unusual in the SCSI world and, as a result, could give your system heartburn. But now you'll know what *LUN* refers to. Again, the vast majority of devices include only one LUN. But suppose a device has more than one LUN; how far could this go?

In theory, each SCSI device can have up to eight LUNs. To make things even worse, each LUN can have a sub-sub-device name called an LSUN (Logical Sub-Unit Number) which can range from 0 to 255. Again, I do not recommend trying to use LUNs or LSUNs; it will be difficult to get drivers to use them.

Once you have resolved your SCSI devices' SCSI IDs, you'll probably have to enable or disable a feature called SCSI parity. Parity is a system for detecting transmission errors. Transmission errors can arise from faulty cables, bad connections, or electromagnetic noise affecting the signal transmission. You may have heard of parity when working with communications systems, which specify odd, even, or no parity. The parity system used by SCSI is a mite complex—more complex than is worth explaining in detail, in fact. But let's get an idea of how it works by looking at simple parity as used by communications systems.

Data communications often send textual data—ASCII text files—rather than binary data, such as Lotus spreadsheet files, WordPerfect document files, or program files. Each character of text is represented by seven bits of data; for example, a capital *A,* expressed as bits in ASCII, is 1000001. If you transmitted 1000001 over a modem and it was received on the other end as 1000011, then the receiver wouldn't get an *A;* it would get a *C* instead. Just flipping one bit can change the whole meaning of a message. (Things that can contribute to bits being toggled in transmission include static on the lines and sunspots affecting communications satellites.)

Parity adds a little redundancy, which makes it easier to spot bad transmissions. Let's look at even parity. With even parity, the sending device gets seven bits to send (a character) and then adds an eighth bit—the parity bit. The value of the eighth bit is set to be either a one or a zero, so that after the eighth bit is added, the total number of bits in the eight-bit group will be even. In the *A* example, the data is 1000001, so there are two ones—an even number. This does not need another one, so the parity bit is a zero. The sender would thus send 10000010.

Assuming that the receiver is set up to expect even parity and seven data bits, it looks at the eight data bits and checks to see if there are an even number of ones. If there are, the receiver assumes that the data was received without error and strips off the parity bit.

Only the data communications equipment (or the SCSI interface components, in the case of SCSI devices) on either end of the communication are interested in this parity bit. The parity bit is added by the equipment on the sending end and interpreted and removed by the equipment on the receiving end. The computers or terminals on either end are unaware that anything happened in between.

Let's take another example of parity. The code for the character *C* is 1000011. In this case, the seven data bits contain three ones. Three is not even, so the added parity bit in this case should be a one. The eight-bit group is now 10000111, which has an even number of ones.

Again, the receiver would recognize the first seven bits as accurately received and strip off the extra bit before storing the byte.

In order for any device to use SCSI parity, all SCSI devices must support it. If any device does not support SCSI parity, then you must disable it for all devices on the chain.

This can become vital because some operating systems like Windows NT will not work at all with a SCSI CD-ROM drive unless it supports SCSI parity. Therefore, you should plan to support SCSI parity from the very beginning; buy only devices that support SCSI parity (and SCSI-2).

Next month, we'll look at cabling the whole mess up and terminating it. (Don't worry—termination is a good thing in the SCSI world.)

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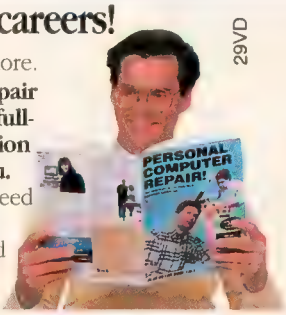

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By Richard C. Leinecker

TROUBLESHOOTING

It's every computer user's nightmare: You turn your computer on, and instead of the usual boot sequence, it just beeps at you. In severe cases, you might not even get beeps. On the other hand, if you're lucky, you might get a message on the screen indicating the problem. In any case, your computer has died. Is it time to take it up to boot hill? Maybe not.

The most important thing to remember is not to panic. Don't scream. Don't pull your hair out. Instead, stop and think before you do anything to your comatose computer. Otherwise, you might make a bad situation worse.

What to Do

Rather than give you a long list of things to try when you encounter various problems, I'm going to take you through a problem-solving sequence that will probably lead to success—or at least to an accurate assessment of the failure—in most cases. I couldn't possibly cover—even in a lengthy book—all of the situations that may arise. I will, however, use examples to illustrate my points.

1. The first step is to clearly identify the symptoms. The symptoms are different from the root problem. The root problem might be that the video card has gone bad while the symptom is that the screen is completely blank.

You must focus on the symptoms first; you must study the evidence before you can determine what the problem is. There's an anecdote about a researcher conducting an experiment in which he teaches a frog to jump when it hears a certain sound. After each jump, he cuts off one of the frog's legs and repeats the procedure. Once all the legs have been removed, the frog doesn't jump when the researcher prompts it with the sound. The researcher concludes that frogs without legs can't hear. This illustrates how misleading conclusions can be if you don't consider all of the available information.

One of the best ways to make sure you factor all of the available information into your thinking is to take the time to write down your computer's symptoms.

Suppose you turn your computer on and absolutely nothing happens. Your first thought might be that your computer's power supply has gone bad. But by making this judgment, you've bypassed the problem-solving process by jumping to a conclusion that may not be correct. To systematically attack this problem, try to avoid drawing any immediate conclusions. Instead, simply note that after turning on the power switch, nothing happens. Now you have no preconceived notions that might lead you astray later.

2. The next thing to do is to think about the entire system that is experiencing the failure. If your computer does nothing when turned on, you must consider the entire route of the electrical circuit from the generating plant to your computer's internal workings.

Electricity enters your building from the power lines. Your computer plugs into an outlet that's a branch of the building's wiring network. The power goes from the room's outlet to the computer's power supply through a cord. The power is converted in the power supply and then goes to the motherboard. There may be other items in the path, such as a power strip or an extension cord. Whatever your individual situation is, make sure that you've included every step of the process in your consideration of what might have gone wrong.

3. The third part of the process is to eliminate links in the chain as causes. Some people prefer to start at the beginning and work forward, others prefer to start at the end and work backwards, and still others prefer to start somewhere in the middle.

Let's start at the beginning. Since the first part of your chain is delivery of electricity to your building, see if you have power: It's possible that the power in your area is out. The next thing to consider is the outlet. Plug a lamp into the outlet to see if it works. The fuse for that outlet might be blown. If you're using a power strip, make sure it's on and isn't defective. Plug a lamp into the power strip to test it.

Once you've established that the power is reaching the power supply, there are three major things that may have gone wrong.

- Something in the system may be drawing enough current to shut down the power supply.
- The connections between the power supply and the outlet may be bad.
- The power supply may be defective.

At this point you should consider contacting trained service personnel. If you're not comfortable working inside your computer, have it repaired. But if you don't mind getting under the hood, here are some things you can try that aren't too difficult.

Before opening the case, pull the power cord out of the outlet (or disconnect it from the power supply). When the case is open, put your hand on the power supply casing to discharge any stray voltage you might be carrying around in the form of static. These are two safety rules—for you and your machine—that you should always follow when you open the case.

Check for loose wires and connections, especially near the power supply. If you see a connection that's loose, try to tighten it and then restart the computer. Sometimes there are extra cables coming out of the power supply that are unused. Make sure you don't try to plug one of these in somewhere.

Try removing all of your peripheral expansion cards and then powering back up with them out. Sometimes a bad expansion card will draw so much current that the power supply shuts down and doesn't deliver any juice to the system. I've even had experiences where boards in low-profile cases touched each other and caused shorts that overloaded the power supply.

4. The last step in the process is to try solutions based on your observations. Many times, you'll need to try several things just to narrow the possibilities down. However, don't try anything that you're not sure about. Paying a technician to fix a problem is far cheaper than replacing an entire system should you venture into uncharted waters and make a major mistake.

The steps I've set forth should see you through most difficulties.

- Identify the symptoms of the problem.
- Think about the entire system that is experiencing the problem and the sequence of events in which something may go wrong.
- Systematically work your way through the sequence to eliminate links and thus focus on the real problem.
- Attempt solutions based on your observations.

Specific Strategies

Now that I've given you a generic approach, I'd like to suggest some specific tips based on my own experience.

Problems with expansion cards. Turn the power off, make sure the expansion cards are securely in their slots, and then power back up. Many times the cards become loose when the computer is moved or cables are plugged in or unplugged.

No color on your monitor. If you don't have any video or the colors are wrong, make sure the monitor cables are in securely. Check the pins in the plug. If one or more have become bent or broken (they're very fragile), you might need to pay a technician to install a new monitor cable. If your monitor is distorted or the picture jiggles, look for other objects in the vicinity that produce a magnetic field. They wreak havoc on a monitor's sensitive magnetic structure.

Printer (or other external peripheral) won't work. If your printer doesn't work properly, try a different cable. For some reason, parallel cables seem particularly susceptible to malfunction. If a peripheral such as a printer doesn't come on or work properly, shut down the entire system and wait for 10–15 minutes before restarting. A number of peripherals such as HP laser printers have circuit breakers that turn back on after a period of about ten minutes.

External modem won't modulate/demodulate. If an external modem doesn't work properly, try a different cable. Make sure the power cord is plugged in and the modem is turned on. Check your power supply output with a voltmeter. Have your telephone company check your telephone line. A bad telephone extension cord

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can make your whole telephone system operate below par.

System demands a boot disk. If you get a message that asks for a boot disk during startup, the setup values may have been lost from your CMOS. Restart and bring up the setup screen. Check to make sure your hard drive's specifications are correct. (It's for times like these that you should write down all the values in your CMOS setup and store them in a safe place.)

Hard drive failure on startup. If you get a hard drive failure or controller error when you first boot, turn the computer off and wait for several minutes before turning it back on. I've encountered many computers that occasionally give these errors but are fine when restarted after a short waiting period.

Poor disk performance. If you're having trouble with your disk drive, run Chkdsk. It's a DOS program that checks the logical structure of your hard drive. It can be run alone (by typing *chkdsk* at the command line) or with the /f switch (by typing *chkdsk /f*) to attempt repair of lost allocation units and cross-linked files. I usually run it without the /f switch first in case there are files that are cross-linked. If the Chkdsk report indicates that I have cross-linked files, I usually try to back them up to a floppy before I use the /f parameter, since it may destroy one of the files and render it unrecoverable. (See "IntroDOS" in this issue for an additional DOS 6.2 alternative.)

Prepare for Disaster

Make sure you always have a boot disk with the version of DOS your computer is running. It's a good idea to have a text editor (EDIT.COM, for example) on it in case you need to edit your CONFIG.SYS and AUTOEXEC.BAT files. Also put CHKDSK.EXE, FORMAT.COM, and FDISK.EXE on this disk. All of these files should be either in your root directory or in your DOS directory.

If your computer boots and hangs up while it's running the CONFIG.SYS or AUTOEXEC.BAT file, start by booting with the system floppy described in the previous paragraph. Use the text editor on the disk to systematically remove items around the area in either file where you think the problem is occurring. Once you've found the cause of the hangup, you'll probably be able to deduce what the problem is and how to deal with it.

The next line of defense is diagnostic software. This is one of the faster-growing categories of software.

It's important that you use the right diagnostic tool. Some programs are good for solving Windows problems and conflicts. Some are good with floppy and hard drive problems. Some are good for determining hardware problems. I've collected and reviewed a number of current packages to help you decide which one meets your needs.

DOS-Based Diagnostic Software

These are the programs to use on DOS-based systems. Often, you don't have enough functionality in a failing machine to run Windows, and in that case DOS is your only option.

QA Plus. QA Plus is the most popular diagnostic software. It's been on the market for years and has entrenched itself as a leader. I found it capable, but not to the degree that it eclipses the other DOS-based diagnostic programs.

The same interface has been around for years. It's simple and text-based. But diagnostic software doesn't need to be pretty to work. QA Plus performed admirably on all tests. It performed well on the IRQ identification functions over a wide range of systems.

Here are the features that could make this your program of choice: It can save report data to a DBF file (that's nice if your company has a large number of systems and it's important to collect the data in one place), and it has a number of command line switches that enhance the program's operations, allowing you to create batch files for a wide variety of systems with different command line switches so that you don't have to worry about remembering a system's exact hardware configuration every time you run QA Plus.

Within the next year DiagSoft will be incorporating remote control software that will enable a user to contact DiagSoft's Electronic Technical Support Center (ETSC) for remote professional assistance. (The remote software has been a part of QA Plus for two years; the change is that it will be more tightly incorporated into QA Plus.)

CheckIt PRO: SysInfo. If you're having interrupt conflicts, CheckIt PRO: SysInfo will probably help you solve them. It made one mistake in reporting my setup. My modem is on COM4 at address 2E8 and uses IRQ 3. The program reported it on COM3 at address 2E8 using IRQ 3. Except for that, it correctly identified the ports and IRQs on my screwball system. That's no small task, since every slot is occupied—by CD-ROM controller, Sound Blaster, scanner interface, extra serial port, modem, network card, and MIDI card. I have some conflicts I'm aware of that I work around, and one I didn't know of until CheckIt told me about it.

The program does more than show you interrupts and ports. Among many other things, you can view and edit your CMOS, run CPU and video benchmark tests, test memory, and test hard drives. Its tests cover all the bases. I didn't find anything lacking.

One especially nice feature is the Windows setup information it provides. You can view a list of setup information, view and edit INI files, and view information about Windows 386 enhanced mode.

The full package, called just CheckIt PRO, includes SysInfo plus Test Tools (a collection of additional tests) and sells for $149.95.

Manifest. Quarterdeck Office Systems ships Manifest with all of its DOS products. It's a complete diagnostic guide to your computer's operation that quickly and easily displays the contents of your DOS system files (which you can edit within Manifest), the performance of your system and of installed cards, and the location of drivers in memory. It offers helpful hints for improving system performance (including a prompt to install QEMM, Quarterdeck's memory manager), along with detailed instructions that include reasons for and against instituting the recommended changes.

Placing the maximum amount of information on the DOS screen in the most readable manner seems to be Manifest's goal, and this is accomplished through logical grouping of tests and information under menu headings. A concise manual is provided, but the information the manual supplies is too sketchy to be made use of by a neophyte, a criticism that can also be leveled at the help screens. A solid grounding in PC architecture is needed to make sense of much of the information given.

Manifest can be used from the command line to return specific information from single benchmarks. For example, to see the status of your interrupts, you can type *mft f i,* and the information needed will scroll up on the screen. Or you can generate a complete report from the command line by typing *mft * * > filename.*

Micro-Scope 5.0. There's something very attractive about a diagnostic program that boots from a disk with its own operating system and takes charge. By using its own operating system, Micro-Scope 5.0 from Micro 2000 eliminated a host of potential problems and at the same time eliminated several links in the sequence of

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events, helping to narrow the focus and spot the problem faster.

Micro-Scope was the most accurate in IRQ and port identification. Not only did it get everything right, but it identified my network card and its IRQ. It didn't look for my Sound Blaster card, though. I was surprised, given the number of systems that have sound cards.

I had trouble with the hard drive on the network server where I work. A lot of things can go wrong in such a complex system. We were at our wits' end until I brought in Micro-Scope. It didn't identify the problem, but it did eliminate a number of possibilities that we could have wasted hours pursuing. The program was worth every penny of its retail price. There is a $100 discount to resellers and institutions.

PC Probe. PC Probe from Landmark Research International delivers most of what you'd expect from diagnostic software, but it really stands out in one area: Its memory tests are the best I've ever seen. I had to pull out the manual and do some serious reading before I understood what the long list of tests did. You don't have to do that yourself to use them. You can simply select the option that runs all memory tests and wait for the results. If any of the tests fail, you can use the manual to discover what the failure means.

A useful program option is the Landmark Benchmark System Speed Test (available separately for $29). On a single screen it shows you basic system information along with performance graphs for the CPU, math coprocessor, and video system. This is a good way of quickly checking a system's performance. It's especially handy if you're responsible for maintaining a group of similar machines. If one doesn't seem to be performing adequately, you can run the Landmark test on several and do a comparison.

The system information PC Probe gives you isn't as complete as that supplied by many of the other packages. There's no list of interrupts and port assignments, so you'll have to work harder to identify conflicts.

µPC-Doctor. Besides all of the regular tasks (hard drive diagnostics and testing, COM port and IRQ identification, memory testing, and identification of basic system components), µPC-Doctor does two things I found especially useful. It offers specific tests for systems with non-Intel chips such as AMD, Cyrix, and Weitek. One of my systems has a Cyrix 486DLC, and this program not only correctly identified it as such, but offered tests specific to that chip. The second thing I found useful was its extended and expanded memory benchmarks. I've been through the HIMEM versus 386 Max versus QEMM wars everywhere I've ever worked. I could have quickly settled the issue with the set of benchmarks that measure the performance of high-memory drivers.

The program correctly found my sound card, but didn't find my modem on COM4. On the other hand, it didn't mistake the modem's location for COM3, as some of the other programs did. It only showed the existence of COM1 and COM2. Sorting out the interrupts and the COM ports is a major problem for most systems today.

This was the only DOS-based package I found that tested my Sound Blaster card. It also tests Stacker, if you have it installed. The 1.1 version

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SofPak
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CheckIt PRO: Analyst—$149.95
CheckIt PRO: SysInfo—$99.95
TouchStone Software
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of the product covers IDE and SCSI testing and an I/O address list.

Rescue. If you're looking for a program that performs a long list of tasks, this isn't the one. Rescue does only one thing: It recovers data from damaged floppies and hard drives. But if you're in need of such help, that's all you care about. And Rescue performs its single task with great skill.

Rescue goes directly to the hardware. That's why it works even when you get a General Failure Reading error. You can't recover a sector that's been physically damaged, but you can recover everything around it. Even, AllMicro claims, if there's a hole punched in the disk.

The new 4.5 version supports DOS 6.2 DoubleSpace, Stacker, and SuperStor.

Windows Diagnostic Software

These are the diagnostic programs to use under Windows.

CheckIt PRO: Analyst. This version of CheckIt for Windows does everything well. It correctly identified hardware and software components on a variety of systems. It contained several pleasant surprises. And because of them I'll make sure I keep this program close at hand.

The first notable feature is the Setup Advisor. It attempts to recommend IRQ, I/O port, memory locations, and DMA channels for almost every common hardware expansion. To see its recommendations, click on the device name in the program window.

I wish I'd had this program when I installed all of my network cards; it would have saved me a tremendous amount of time. It lets you know what IRQ and I/O port it thinks you should use for NE2000 cards. Registering the software and receiving regular updates is an important part of maintaining this feature.

There's another nice feature called the Software Shopper. It lists the most common software available today. Once you select a software package from the list, it shows you the system requirements, such as the processor, memory, storage space, and graphics. Since the system capabilities are listed right there as part of the package, you can easily determine if you have what it takes to run a particular software package. This would be perfect for MIS personnel or purchasing agents.

QA Plus/WIN. Ten large icons greet you when QA Plus/WIN for Windows runs. Because of this graphical look, it's easy to figure out how to access each test and information area. Clicking on the icons reveals capsule information that provides pertinent facts about each of your computer's subsystems.

The areas covered are the system board, video system, multimedia interface and components, hard disks, floppy drives, keyboard, COM ports, printer, mouse, and any existing LAN interface. When you access information about the LAN interface, besides showing you standard information such as the server name, the software version, and the maximum number of connections, QA Plus/WIN will also tell you who's logged on to the network.

QA Plus/WIN also includes a remote diagnostic TSR that lets you log on to a system from another computer via a modem. With it, you can diagnose problems in a remote system, or you can show remote locations how to perform tasks.

WINPROBE. WINPROBE isn't fancy. But diagnostic software needs to be useful and accurate, not fancy. WINPROBE correctly reported IRQs and I/O ports, memory and system resources, and other installed hardware. There are plenty of reports that give you the scoop on your system.

One thing Landmark Research spent time with was providing lots of information on the Windows system metrics. This is useful when you need to know the exact settings and capabilities of subsystems such as your installed video or printer.

There's an interesting part of the main display that graphs the system processor usage. I wrote a similar program several months ago that ran in the background. I wrote it to compare the amount of processor time that different Windows applications took. This information was important to me because I was comparing similar software packages for Test Lab. You can also use this information to decide whether running a particular application in the background will significantly degrade performance.

A complete toolbox called the Windows Troubleshooter's Toolbox contains WINPROBE, Landmark DOS for Windows, and PC Certify and is available for the suggested retail price of $247.

WinSleuth Gold Plus. Diagnostic software can seem complicated. To use it, you must have a knowledge of hardware systems, or the software must present the information clearly, in a way that's easy to understand and use. WinSleuth Gold Plus is easy to understand and use, even for relatively inexperienced people.

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The program designers figured out how to show options and present the information from a single screen. Along the top is a row of buttons with icons that indicate the computer subsystem that's being displayed in the information window. Along the right side of the information window is a column of buttons that let you perform tests and see various kinds of information for the selected subsystem.

Each subsystem has an animation that appears in part of the screen. The animations are not only attractive, but give you a better idea of what's in the subsystem you're looking at. When you look at the memory information, for example, you see a cross section of a person's head with electrified memory chips. This isn't essential, but it's a nice touch.

The program performs well. It had no trouble identifying the parts of my system and provided all of the important information, such as memory layout and testing, interrupt usage, specific video system information, and hardware configuration.

Skylight 3.0. The folks at RenaSonce Group took a different route to arrive at their idea of the perfect diagnostic software. The program has almost no graphics. Each report window opens and gives you information as pure text. The only exceptions are the memory maps, which are depicted graphically. After I became accustomed to not seeing any pictures, I began to appreciate what the designers had done. They opted to concentrate on text so that they could present as much information on the screen as you need.

Most of the other Windows diagnostics give you a report in a single window. To get other reports, you must discard the window you're looking at. (With these other programs you can print the report, if you want the information to remain available, but that's not as useful as having several reports onscreen at once.)

Skylight opens a separate window for each report. You can size the report windows and view all information simultaneously. This might be important in tracking down problems that your system is having. I found it useful to view the program memory report in one window while looking at the resource usage for current tasks in another.

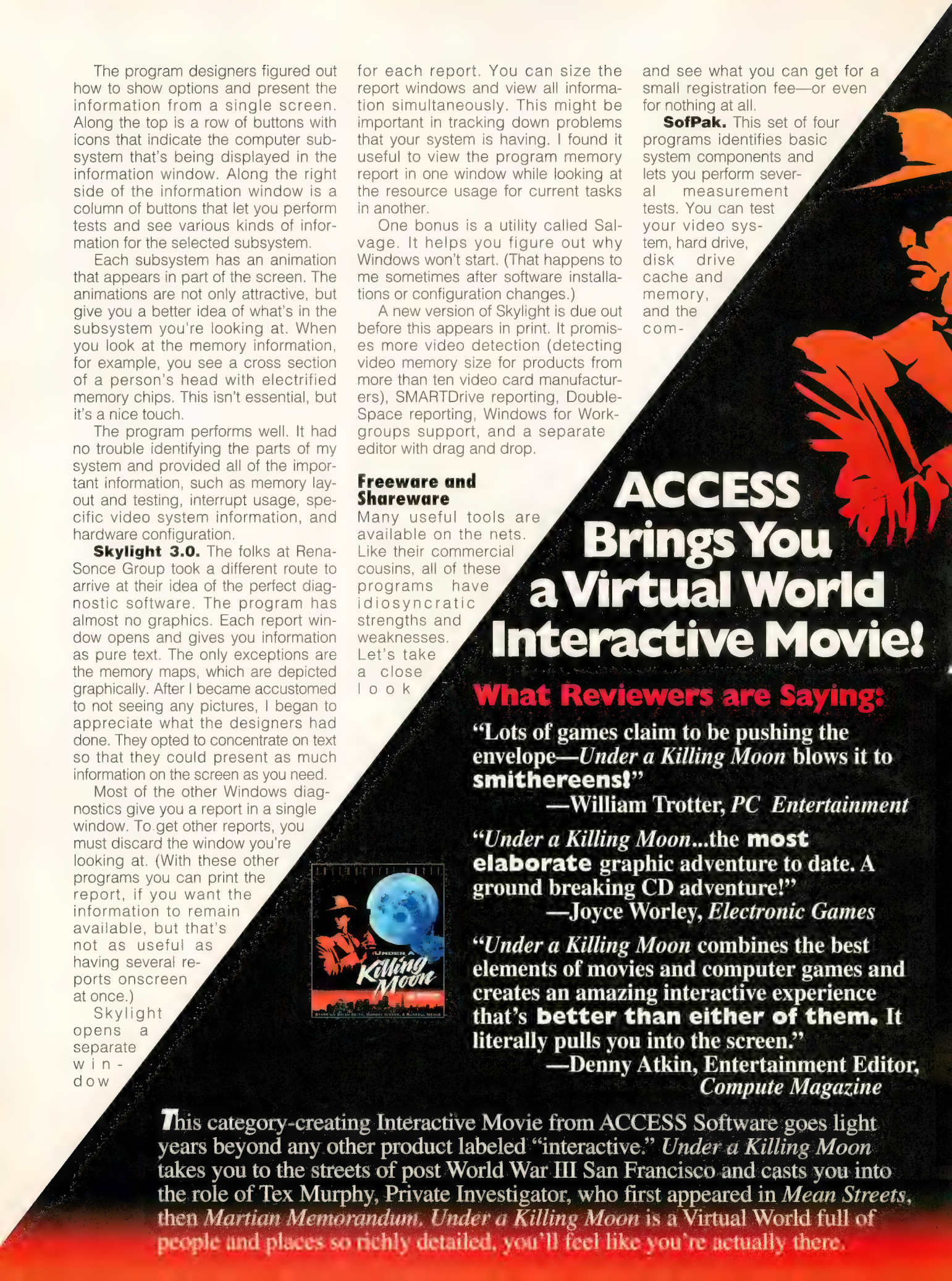
One bonus is a utility called Salvage. It helps you figure out why Windows won't start. (That happens to me sometimes after software installations or configuration changes.)

A new version of Skylight is due out before this appears in print. It promises more video detection (detecting video memory size for products from more than ten video card manufacturers), SMARTDrive reporting, DoubleSpace reporting, Windows for Workgroups support, and a separate editor with drag and drop.

Freeware and Shareware

Many useful tools are available on the nets. Like their commercial cousins, all of these programs have idiosyncratic strengths and weaknesses. Let's take a close look and see what you can get for a small registration fee—or even for nothing at all.

SofPak. This set of four programs identifies basic system components and lets you perform several measurement tests. You can test your video system, hard drive, disk drive cache and memory, and the com-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"*Under a Killing Moon* combines the best elements of movies and computer games and creates an amazing interactive experience that's **better than either of them.** It literally pulls you into the screen."
—Denny Atkin, Entertainment Editor, *Compute Magazine*
This category-creating Interactive Movie from ACCESS Software goes light years beyond any other product labeled "interactive." *Under a Killing Moon* takes you to the streets of post World War III San Francisco and casts you into the role of Tex Murphy, Private Investigator, who first appeared in *Mean Streets*, then *Martian Memorandum*. *Under a Killing Moon* is a Virtual World full of people and places so richly detailed, you'll feel like you're actually there.

puting engine. The file can be found on CompuServe in the IBM Hardware forum, in the library section under General, filename SOFWIN.ZIP. There is no registration charge for SofPak. But there are professional measurement tools available from the company that do carry a registration fee. The current releases are dated July 1993.

PCAUDIT measures basic system performance and does a survey of your system. PCMEASURE is an engineering performance measurement and analysis tool. CORSPEED measures and displays core engine performance. Each of these advanced tools is $350. PCSELECT is a special version of PCMEASURE used by members of the High Performance Team on CompuServe. PCSELECT is $69, which includes High Performance Team membership. In January, Softwin Laboratories released RUNSPEED, which measures software running speed for Windows, Windows NT, OS/2, and DOS applications. The price of RUNSPEED is $39.

The Modem Doctor 5.2. A comprehensive program that tests serial ports, UARTs, and modem hardware, The Modem Doctor is very thorough and will probably give you more information than you thought you'd ever need about your modem's operation. The file can be found on CompuServe in the IBMCOM forum, library 7, filename MDR52-.EXE. The program is shareware and the registration fee is $19.95.

Microsoft Diagnostics. This is a fantastic program for finding out what's going on in your system. It offers most of what many commercial packages offer and can be downloaded free. The file can be found on CompuServe in the MSDOS forum, library 3, filename MSD.ZIP, and it's available with most versions of DOS 5.0 and higher. To see whether you have it on your hard disk, just type *MSD* at the command line. The odds are in favor of its being in your DOS directory.

Dr. Watson. This is a Windows diagnostic tool that updates a log file when there are unrecoverable errors. When the error occurs, a dialog box appears in which you can type in comments about what you were doing prior to the error. You can review the log file with Notepad later. The file can be found on CompuServe in the ZENITH forum, library 15, filename WATSON.ZIP, and it's included with every copy of Windows 3.1.

Computer Healthcare

As in caring for your own health, keeping your computer in the pink involves nearly equal measures of preparation and prevention. When something goes wrong, let patience and logic be your watchwords. Usually, it's something you can fix yourself. The moment you become uncomfortable, however, sensing that you've ventured out of your depth, close up the case and call a professional. If you suspect the type of problem that can be determined by diagnostic software, use the package recommended in this article for that particular kind of problem. Always practice electrical safety precautions when the computer case is open—your health is far more important than your computer's.

Above all, take the time to think before attempting to dive into solutions. Your computer was designed to give you many years of service, but everything breaks down eventually. Just bear in mind that most things that break can be fixed.❑

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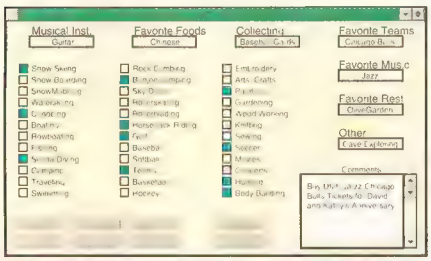

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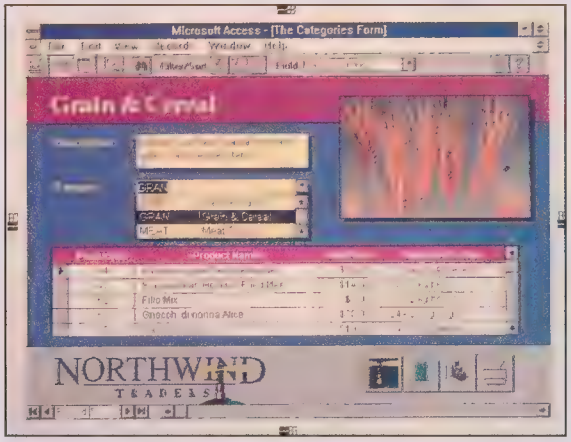
DATABASES



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COMPUTE's Getting Started with Databases was written by Tom Campbell.

WHY USE A DATABASE?

One of the questions I'm asked most as a computing professional is, Should I get a computer? My answer never varies. If you're getting along fine without a computer, you'd probably end up buying the most expensive doorstop you've ever seen. But if you're doing anything repetitious and error-prone, having trouble maintaining your contact list on the job, or running a business in which maintaining inventory records by hand is a problem, you're ready to buy a computer—and a database manager.

Database management has long been one of the best reasons to use a computer, so much so that the second high-level computer language invented, COBOL, has it built in. It's a task uniquely suited to the price-performance ratio a computer represents: Most databases are stored on disk instead of in RAM, yet by its nature disk-based data can be indexed and retrieved so fast that disk storage, while far cheaper than RAM, is nearly as quick. Further, database technology on micros surged ahead of that on mainframes when dBASE II was invented in the 1970s, and it hasn't looked back since.

A database management system, or DBMS (what would any field of study in computing be without a few gratuitous abbreviations tossed in?), lets you store information in tables, a row-and-column format familiar to anyone who's ever signed a guest book or filled out a membership roster.

The list itself is called a table. The rows are usually called records, and the columns are called fields. Sometimes, tables are called databases, but the term *database* normally encompasses everything that makes up a database application: tables, data entry forms, reports, and so on. If the terminology seems a bit, uh, fluid to you—not to mention maddeningly vague—you're right. Database managers have evolved at a furious rate for the last decade. Mainframe database theory has strongly influenced the development of PC products, but the PC market is a richly varied one and has played host to dozens of products, each of which employs a slightly different vocabulary.

The fastest database managers use two basic tricks to get the best performance out of your computer, and believe me—they're fast. The first is pretty straightforward: When you design the table, you're asked to specify a maximum size for each field. For example, you might allot 15 characters for the first name, 25 for the last name, 35 for the city, and so on. That way, once the database knows what number the record is, it can position the disk to—or *seek*, in computerese—that record simply by multiplying the record number by the size of the record. Hard disks can seek anywhere in thousandths of a second; all they need to know is where to go. (For that matter, even floppies are fast enough for most database operations; that's how efficient database managers are.)

The second trick database managers use is indexing. An index is a copy of one or more of the fields sorted and kept largely in RAM. When you design the database, you're asked which fields you want indexed. While indexing consumes extra disk space and memory, it rewards you handsomely in performance. Microsoft FoxPro's legendary indexing scheme can in some cases search a million records in two or three seconds, but all of the products mentioned here do just fine for anyone with less than 100,000 or so records.

If you read this magazine, chances are you need a database manager. Read on to find out which will best suit your needs.

HOW TO CHOOSE A DATABASE

Now is the second-easiest time to buy a database manager in microcomputer history. The easiest time was around 1979, when you could do one of the following.

1. Buy dBASE II and join a million other programmers who had done the same thing.
2. Write your own data-

DATABASES

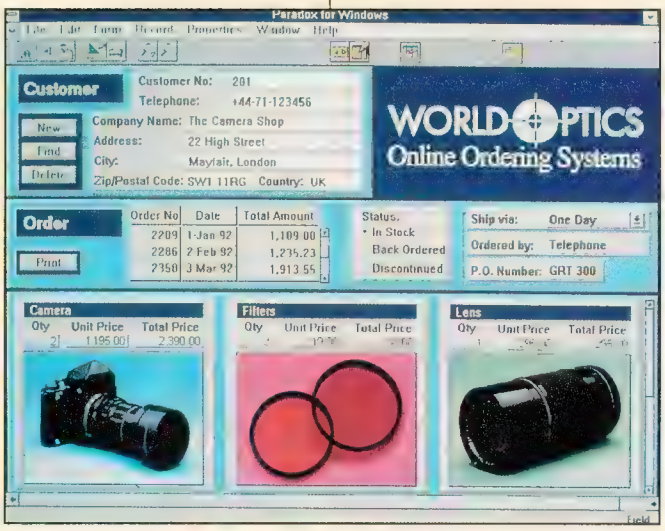
base manager.

The state of the art in database managers has improved drastically since then. Now dBASE II has been replaced by dBASE IV 2.0 (Borland, 408-438-8400, $795); another database manager, Microsoft FoxPro (Microsoft, 800-426-9400, $495), has snatched the dBASE crown right out of the hands of the dBASE developer; only a systems programmer gone mad would attempt to create his or her own database manager; and the leading database development language is Visual Basic for Windows.

If you're thoroughly confused right now, well, good. You have a taste of what it's like for professionals in the chaotic world of database management. Now let's try for a clear answer to the laughably naive question, How do I pick a database manager? The answer, as computer people always love to tell you, depends on your needs. Sometimes, it's painfully difficult to articulate your needs when you're starting out in a new computing endeavor. This article will take the reverse approach of most other database roundups. Instead of listing the brand-name database managers and their features, I'll break down the most common reasons to use a DBMS and then suggest which ones are best for each job.

1. You have a simple job to get done.

The winners here are both windows programs: Approach 2.0 for Windows (Approach Software, 415-306-7890, $99 until March 31, then $395) and FileMaker Pro for Windows (Claris, 408-727-8227, $129). Each has good sample applications to get you started; FileMaker even has a separate manual just for the samples. Approach is a Windows veteran and shows surprising depth for such an easy-to-use product. It has a terrific search feature, making reports incredibly easy to produce, and a strong set of drawing tools. FileMaker is a little broader and has full compatibility with its sister Macintosh product.



Paradox for Windows from Borland International

2. You have a complex job to get done.

If you have a complex job to get done and don't care about dBASE programming compatibility, Paradox for Windows (Borland, 408-438-8400, $149.95) and Visual Basic (Microsoft, 800-426-9400, $199 for standard edition, $495 for professional edition) are the hands-down winners. As a programmer, I care a lot about how a programming system will feel to me day in and day out over a period of years, and Paradox feels so much better to me than any other DBMS that I can recommend it without reservation. Its ObjectPAL development language is easily the best for creating database systems of any complexity, and its object-oriented user interface cuts the need for extra programming by a factor of 2 compared to, say, FoxPro. Paradox is beautifully designed to handle even the biggest database chores, and it can use dBASE data files as easily as it uses its own. The Paradox documentation is the best language training manual I've ever seen, and there are now lots of good books on Paradox. Paradox for DOS is also an excellent product, but its language is incompatiible. If you plan to develop for both DOS and Windows, FoxPro is probably a better choice because you can create versions for both with the same language.

Visual Basic 3.0 isn't nearly as good for the full-time database programmer and won't do for the person who routinely creates large-scale programs, because it doesn't come with the form-building or data integrity tools that Paradox has. Nor is it as fast in maintaining huge data files as Paradox. But for most people, it'll do the job well. It's simple to learn if you know previous versions of Visual Basic, and it's relatively inexpensive. Be sure to get the professional edition if you have serious data management chores.

3. You want to get a job programming databases.

If you want to get a job programming databases, your choices are pretty much limited to FoxPro, dBASE IV, and Paradox. The dBASE language, fully supported by both FoxPro and dBASE IV, is relatively easy to learn. It's more rewarding than most languages because you can get a lot done with very little programming. On the other hand, Paradox for DOS is better from a programmer's standpoint because its language is far more productive even than dBASE's, and so is its development environment. This goes double for Paradox for Windows, which employs a very different dialect of the PAL programming language. Paradox has a sizable segment of the market, but still much smaller than dBASE's. FoxPro's manuals are terrible if you want to learn the language, and you'll have to spend an extra hundred bucks or so on third-party books. Even though dBASE has much better manuals, you'll still probably want to invest in another book or two if you're an absolute beginner. Both FoxPro and dBASE have another built-in advantage, which is that you can develop programs that run unchanged in either DOS or Windows. Paradox requires that you choose one or the other. To sum it up: Paradox for Windows is the most rewarding from a programming standpoint, but

OTHER GAMES MAY TALK.
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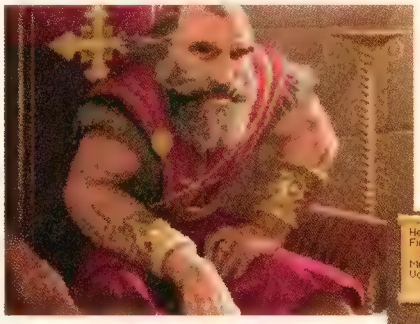
Star Trek: The Next Generation's

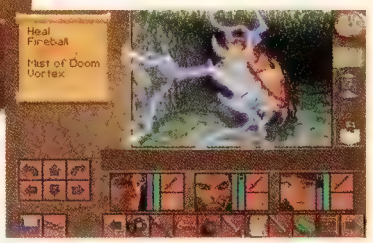
PATRICK STEWART

in

LANDS OF LORE: *The Throne of Chaos*

With Patrick Stewart as the voice of King Richard, *Lands of Lore* has a royal advantage over other fantasy games: An actor of real authority in a role of authority, at the head of a huge cast of heroes and villains who speak, rant and roar their way through the most vocally interactive role-playing adventure yet devised. (A mammoth 130 MB of digitized speech makes it possible.)





The Dark Army is on the move, led by the shape-shifting sorceress Scotia—and each time you meet her she'll be more powerful and terrifying than the last. But your powers can grow, too. Experienced-based character development makes great warriors of those who take arms (in real-time combat) against a sea of indescribable monsters and makes mighty wizards of those who cast Larger-Than-Life spells. Explore ancient castles, living forests, hidden lairs, bustling towns, haunted caverns, through 30 enchanted levels made vividly real by more than 20 MB of compressed art and special effects.

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DATABASES

dBASE or FoxPro will make it easier to find work.

4. You want to start a small consulting business doing database applications.

Perhaps you want to go into business for yourself, perhaps as a part-time hobby to earn a few extra bucks or as a way to separate yourself from your day job. Database programming is probably the best way to do this, because database needs are so varied and vast. Here, you're facing slightly different issues than in database programming. The popularity of the development environment you choose isn't so important—your clients will seldom care whether you use Paradox for Windows, dBASE, COBOL, or an abacus to get the job done, as long as it's a better solution than they had before. You need to factor in ease of use and the ability to create programs you can distribute.

Here the term *ease of use* doesn't refer to how easy the product is to learn, as it so often does. Instead, it refers to how quickly and conveniently you as a programmer will be able to create professional-looking applications or to customize ones you've created. Here again, Paradox and Visual Basic are comfortably in the lead unless you're an experienced dBASE programmer. If that's the case, FoxPro has a better implementation of the dBASE language than does dBASE, but dBASE has a massively better applications generator.

5. You want to get the most out of your BASIC programming skills.

If you're already a BASIC programmer, Visual Basic 3.0 is the only game in town (forget 2.0, which doesn't have database capabilities). Visual Basic or Word Basic programmers get extra points. Access (Microsoft, 800-426-9400, $495) is pretty good, too, but it's more expensive, and the runtime (which lets you distribute your Access programs to people who don't have Access) costs an extra $500. Ironically, Visual Basic is better for BASIC programmers because it offers much more access (sorry) to onscreen controls such as text edit fields and scrolling lists.

Lotus Approach from Lotus Development

6. You're just interested in learning the state of the art.

If you want the Ferrari of databases, choose Paradox for Windows. It's not the most popular, but its language, database, form, and report design tools are years ahead of the pack. Because it's so capable, you can charge a premium for your programming skills if you're a Paradox for Windows pro; you get a lot more done per hour than with dBASE or FoxPro, so your increased wage is still money well spent from the client's viewpoint.

7. You want to sell a custom DBMS you're planning to create.

One of the best ways to make money using a DBMS is to apply the focus of a personal interest to database management. If you run a pet store and have found that turnkey database applications don't work very well in your field, you might want to put your computer literacy to work by creating a better DBMS and sell it to other pet store owners. It's probably best to stick with dBASE or FoxPro because there are lots of third-party dBASE code libraries you can customize. If you're already a Visual Basic programmer, though, go with it. However, be sure you know the costs of a runtime package up front. For Visual Basic, it's free. For Access, it's $500, bringing the list price of Access plus the runtime to about a grand. For FoxPro, the total is closer to $1,500. For Paradox, it's another $500.

HOW TO PROGRAM A DATABASE

Database-programming languages have followed an interesting learning curve over the years. When dBASE II came out, the language was so much simpler than COBOL and other mainframe languages that people didn't even know it was a language.

Over the next few years, dBASE became incredibly baroque, moving from the svelte dBASE III PLUS to the massive, ungainly dBASE IV. Other languages, such as Clipper from Nantucket (now Computer Associates) and FoxBase from Fox (now Microsoft),

DATABASES THAT SING AND DANCE

If you want your database to appeal both to the eyes and ears, which database manager should you choose? When it comes to multimedia support, the program that has always been slightly ahead of the pack is Superbase 2.0 for Windows (Software Publishing, 408-986-8000, $495).

Superbase supports 15 graphics file formats, including BMP, PCX, TIF, EPS, CGM, and DRW. It also provides direct audio, animation, and video support through Windows' Media Control Interface (MCI). An optional Video Player lets you play back both hardware-based (AVS) and software-based (AVI) videos. And an op-tional image API lets you add additional image filters, such as a fractal compression filter that can squeeze an image to as little as 1/100th of its former size.

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Card 72

DATABASES

tried to remain compatible with dBASE while adding their own extensions. By this time, the term *XBase,* meaning "any dBASE dialect," had arisen, and a standards committee had even formed to determine what it means to be dBASE—that is, XBase—compatible. Strangely, most XBase languages lack some seemingly fundamental capabilities, such as creating a new data file under program control if one doesn't exist. The market was ripe for Paradox, which can't run dBASE programs but can read dBASE data files. (It can create a data file under program control, too—see the example below.) Paradox is the premier example of a state-of-the-art database language, with both simplicity and depth.

The first program is the same in any language. To write it in Paradox, choose New/Form from the File menu and press Enter twice to accept the defaults. This creates a window on which you design a data entry form. Click on the push-but-

HOW TO USE DATABASES WITH OTHER APPLICATIONS

One of the more perilous questions of recent years has been, How do I use my database with other applications? File translation has been iffy, and DOS has never supported any kind of interprogram data communication standards. Windows changes all of that.

Greatest Common Denominator: OLE

By far the most reliable means of connecting documents from different applications is to use OLE objects. For example, suppose you have a field named Comments in a Paradox table you send to your field offices every month. You note comments using Microsoft Word for Windows and then use the Windows Clipboard to copy and paste them into the Paradox table every month. One month, you get two complaints from one of your biggest customers, and in your nervousness you forget to paste the changes into the database. Last month's stale data is there instead. Your field offices aren't alerted and screw up again. Next month, you'll probably remember to copy and paste, because you've just lost a great client!

A much better solution would be to use an OLE field in your Paradox document. Paste the document in just once, and Windows will handle maintenance for you from then on. Anytime the WinWord document changes, Windows—not you, and not Paradox—will take the responsibility of updating your Paradox table for you. What's most amazing is that the programmers creating the applications just need to know how to support OLE. They don't need to know anything about the product that created the OLE data. So any application that knows about OLE will support all other applications that know about it.

A little jargon is in order here. An application that can receive OLE data, as Paradox does in the example above, is called an OLE client. An application that creates the OLE data and can let other applications manipulate it is an OLE server. Paradox, for example, is an OLE client (hurray!) but not an OLE server (boo!).

Not So Bad: Copy and Paste

If you don't know how to use the Windows Clipboard, stop reading this article, stand up, and spank yourself. As a time-saver and for elimination of errors brought on by duplicate data entry, the Clipboard is worth the weight of your Windows manuals in gold. In general, the Clipboard works like this. Select something (by dragging the mouse in a Windows database, spreadsheet, or word processor, for example). It will be highlighted in reverse text, usually white on a black background. Choose Copy from the File menu. The Clipboard will have an invisible copy of whatever you've chosen. Now pop into another application and choose Paste from the Edit menu. A copy of the items you've selected will appear in the new application.

What's going on under the hood is much more interesting than this seemingly trivial example shows. The Clipboard can actually hold many different representations of the same data object simultaneously. If you copy cells from your Excel spreadsheet and paste them into Paintbrush, they'll appear as a bitmap. If you paste them into Word for Windows, they'll appear as an OLE object. If you paste them into Notepad, which doesn't support OLE, they'll appear as delimited text. That's because Excel has courteously registered the cell values you've copied in each of those formats. Most database managers stop at saving values as text, but that's plenty for most uses of the Clipboard.

While the Windows Clipboard is an honorable way to trade small amounts of data among applications, if you do it routinely, get OLE to do the job for you—not so much because of its minimal time improvement, but because it lets you adhere to the cardinal rule of database management: Never duplicate data.

Least Common Denominator: File Formats

For years now, any database worth its salt has been able to import dBASE files and Lotus 1-2-3's WKS spreadsheet files. This is important if you're moving to a new database manager—in which case the old one can probably export one of these formats—or if you need to get database information from a nondatabase application. Many Windows databases won't act as either OLE clients or OLE servers, so you'll have to rely on importing data files. DOS doesn't have OLE, of course, so you'll need to use translations there as well. You need to know whether your dBASE files use memo fields (see the glossary). Most applications don't know how to read or write them.

DATABASES

ton tool on the toolbar, and a button will appear. Click your right mouse button, and a menu will appear next to the button. This is called the Properties menu, a brand-new innovation that first saw the light of day in Smalltalk systems 25 years ago. Such a menu lets you edit things associated with the selected item; in the case of a button, this would include such things as what happens when it's pushed and whether it's selectable. In the case of a form, it would include its color and what happens when a button is pushed. At any rate, choose Methods from the Properties menu for your push button and double-click on pushButton. Now enter the following script.

```
method pushButton(var
  eventInfo Event)
msginfo("Hello", "Hello,
  world.")
endmethod
```

Click on the lightning bar icon when you've finished the script. You'll be asked if you want to save

A TEN-STEP GUIDE TO GUERRILLA DATABASE MANAGEMENT

There are two ways to get things done in life: the way you're supposed to and the way that actually gets things done. This is a ten-step guide to database management for the guerrilla user—someone who just wants to get the job done and get out with a minimum of fuss.

1. Play, and change your mind a lot.

The books tell you to plan your database and file schema on graph paper, pray to the relational gods, and sacrifice virgins when necessary. The thought is that you don't want to commit the unforgivable crime of bad planning, because it will cost you in productivity for at least the next hundred years. Don't be ridiculous. Today's DBMSs are so flexible and so easy to design and redesign that you should make it your highest priority to play with them and try out neat stuff. Sure, you'll make mistakes. But you won't feel locked into stale ideas.

2. Don't duplicate data.

You should never duplicate data. For once, the experts are right. If you have any application in which a customer's name or address needs to be typed in more than once, for example, you have a problem. In general, you should never type in anything more than once. If the information has been typed in once, it should appear in a lookup field. Duplicate data means that someday you'll forget that you have that data in two places, and you'll lose customers. You should only have to type in information a second time when you're looking something up.

3. Use a new table anytime you need one.

Some books still promote bad database design because of DOS's open file limitations or early DBMS designs. They would use a single table where multiple tables make more sense. Under Windows and any DOS DBMS worth its salt, open file limitations are irrelevant.

4. Never sort; always index.

Early DBMSs had a sort command that would change the physical location of records. Sorting should be handled by indexes, never by physical reordering of data. Sorting is incredibly slow, and any indexing scheme that relies on physical record placement is flawed.

5. Make sure the DBMS lets you change the table layout.

A few DBMSs don't let you change the design of a table once you've created it—that is, you can't change the names of fields, add fields, or remove them. Make sure you can change your mind about tables at any time.

6. If you hire a consultant, get second and third opinions.

I've seen many database applications created by consultants, and I'm usually shocked at how bad they are. Don't hire a consultant unless you have a money-back guarantee, you've already used one of his or her applications extensively, or you have a ringing endorsement from someone you'd trust with your life.

7. Compatibility with dBASE is overrated.

I used to be bullish on dBASE file compatibility. My theory was that if your application couldn't at least export dBASE data files, you were headed for trouble if the company that created your application went under. Nowadays, compatibility means any number of things, but you still need to be sure there's some way to get the data out of any database application you use in case the company that created it goes belly up.

8. OLE!

As a bleeding-edge programmer, I shouldn't admit this, but it was a year before I tried OLE. It's childishly simple to use, and you owe it to yourself to read the OLE chapter of your database, spreadsheet, or word processor programs that support it. OLE will change your life, give you healthier teeth, and make you more popular with the in crowd. Well, maybe not—but break with tradition and read the documentation for once.

9. Use the Clipboard.

I discuss using the Windows Clipboard elsewhere in this section. While you should never use it for routine data transfer (that's what OLE is for), you'll save a ton of time if you spend the half-hour it will take to master the Clipboard. It will save typing time and data entry errors for as long as you use a GUI environment such as Windows or the Mac's.

10. Ignore these rules and make up your own.

The truth is that not even the experts know what they're doing all the time. This field is much too young for anyone to be sure about the best ways to create forms or manage data.

Try to keep an open mind, but also be willing to accept an approach that works even if it hasn't been sanctified by the higher-ups. Sometimes, the end does justify the means.

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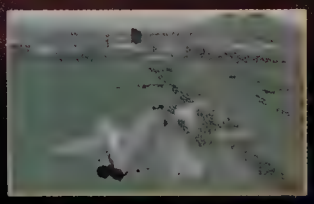

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DATABASES

the script you've created; click on Yes. The form will appear with its lone button. Click on the button, and a handsome dialog with 3-D buttons will appear, complete with the Hello caption and, in the middle of the dialog, the message *Hello, world.* You'll be given three choices: Yes, No, and Cancel. Any of them will do.

Another example will make use of the return value you can get from a dialog box. This is the kind of script you'd see for a Delete Record button.

```
userChoice = msgQuestion
  ("Delete", "Sure you want to
  delete?")
if userChoice = "Yes" THEN
message("Record now
  being deleted")
contaxCursor.delete-
  Record()
endif
```

The msgQuestion dialog is closely related to msginfo; if you click on its Yes button, userChoice will be given the value Yes. This is as easy as database programming gets. Like many aspects of ObjectPAL, the Paradox programming language, it shows how easily you can do what once would have been an onerous task.

My favorite short PAL example shows the ease with which you can create a new table (data file) under program control. In dBASE, you can't do this at all. Instead, you're forced to use interactive table design tools. While this is simple for a programmer, it's not for an end user. And it's hard to create a turnkey application for end users with this issue in mind. What if a data file is lost or damaged? It happens surprisingly often, and end users have no choice but to call in an expensive consultant (perhaps you, if you're lucky). Ideally, the application itself should be able to handle problems like this on its own. But dBASE can't, at least not without an extension written in C. In Paradox, it's this easy.

```
method pushButton(var
  eventInfo Event)
var
  Contax Table
endVar

  Contax
  = create  "contax.db"
  with "Last Name" : "A25",
  "First Name": "A20",
  "ID Number" : "S"
  key "Last Name"
  endCreate
endmethod
```

This script creates a file named CONTAX.DB with three fields: Last Name, First Name, and ID Number. Note also that long names and names with spaces are allowed in newer DBMSs such as Paradox and Access, whereas dBASE still limits you to ten characters and no spaces. The A25 for Last Name means you're limited to 25 characters for a last name; this could just as easily be A30 or A100. A Last Name key allows you to sort by last name and makes it much faster to search.

DATABASE GLOSSARY

database. See **DBMS.**

dBASE compatibility. This usually refers to the ability of a program to use or create data files in dBASE's DBF format. Usually, DBFs don't include memo fields or indexes. The term can also refer to full dBASE for DOS language, memo file, and index compatibility. FoxPro, CA-dBFast, and CA-Clipper are all products that can run most dBASE for DOS programs unchanged, and can also use their memo files and indexes.

DBMS. Short for *DataBase Management System.* This is different from a database, which is usually information that can be stored in categories, such as names, addresses, and phone numbers. Lately, databases are being called tables to emphasize the theoretical view of data as rows and columns and to set aside the term *database* as an umbrella for the all-encompassing database application.

field. If you imagine data in tabular format, with column headings such as Last Name, First Name, and ZIP code, the fields are the columns. Most database managers require that you give fields a maximum width for efficiency; free-form database managers aren't as fast but will allow virtually any amount of text in any field.

index. A means of sorting records by a particular field and speeding search functions. An index is a copy of one or more fields kept in memory—for example, all the last names or all the states. Searching an index is much faster than searching a disk-based table, but it consumes extra RAM.

memo field. Most fields in a database are of fixed size—a 30-character last name, an eight-byte numeric field, a two-byte time field, and so on. Memo fields let you store arbitrary amounts of information, usually textual, without wasting space on the disk for records that don't have such information. Useful for recording patient histories, special directions, and lately more exotic values such as images and sound.

record. If you imagine data in tabular format, with column headings such as Last Name, First Name, and ZIP code, the records are the rows. Think of a record as being similar to a driver's license: The information on each driver's license varies, but the format (its field layout) is the same on all licenses.

report. Selected information in a database printout. For example, if you print out the names of customers who haven't paid yet, you're generating an accounts receivable report.

row. A less common name for record.

runtime. A means of distributing just enough of the database manager so that it can run your programs but not enough so that the user can create new programs with it. This allows you to create database applications and give or sell them to other people. Normally, the runtime costs extra.

seek. The term used for positioning a disk to a specified place. This may seem like an irrelevant issue, but the performance of any database hinges on seek issues. The fastest databases have great indexing schemes, require fields to be of a fixed length, or use a combination of these schemes, any of which can maximize seek time. ❑

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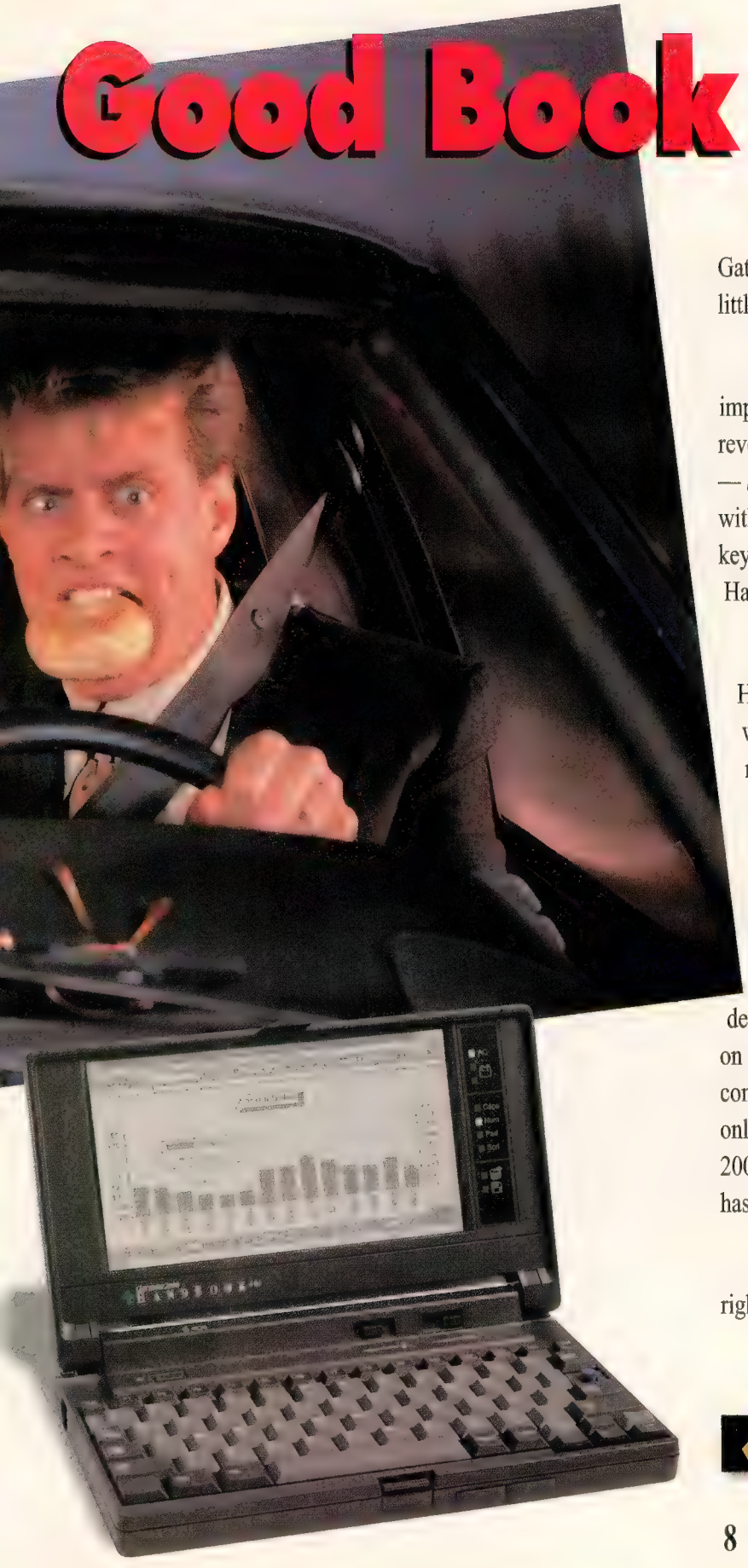

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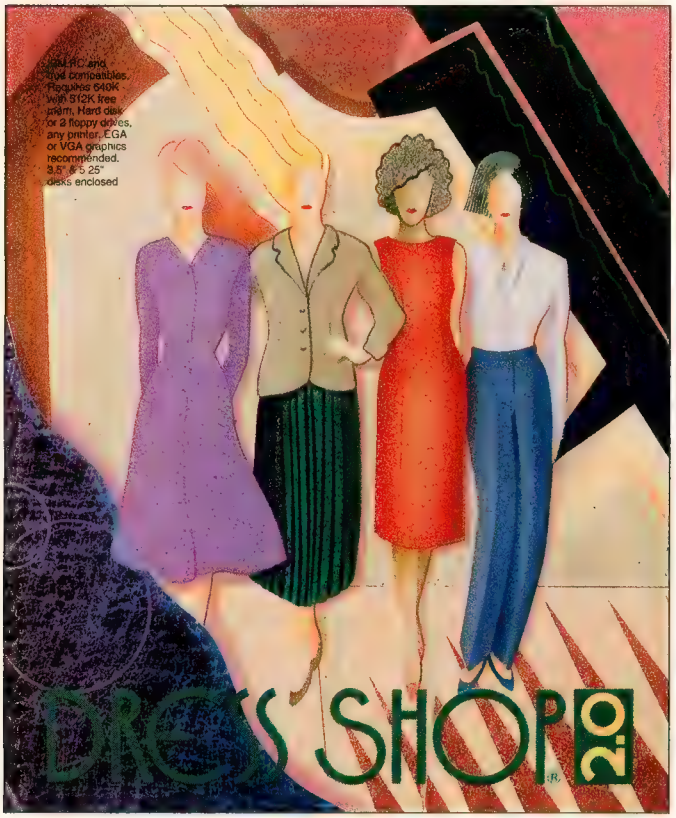
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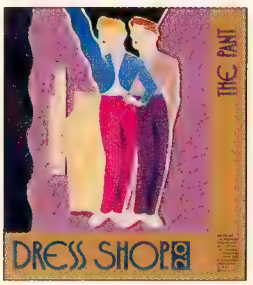

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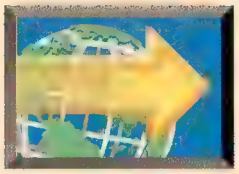


SEVEN MULTIMEDIA FAST FORWARD POWER TOOLS

BY DAVID ENGLISH

You've probably heard the cliché, To get the job done right, you need the right tool. The same principle applies to multimedia. As multimedia becomes a larger part of our everyday computing, software developers are creating new and more useful multimedia utilities. Here are seven utility packages that should be a part of everyone's multimedia toolkit.

The first one might surprise you. It's SMARTDrive, which comes free with both DOS and Windows. The latest version, available with DOS 6.2, finally caches CD-ROM drives, and it does it using much less memory than the third-party cache programs I've tried. In fact, if you've already upgraded to DOS 6.2, you may be caching your CD-ROM drive without even knowing it—the DOS 6.2 installation program automatically adds your CD-ROM drive to the list of cached drives.

Next up is CD Power Pak (Corel Systems, 800-772-6735, $99). It includes software that caches CD-ROM drives, a program that lets you play your audio CDs from your CD-ROM drive, a WAV file editor that lets you edit your sound files, a systems browser that helps you troubleshoot your Windows system configuration, a graphics file manager, and a wallpaper flipper that changes your Windows wallpaper each time you start Windows. In addition, you get a pair of Koss headphones, a CD-ROM with over an hour of music clips and sound effects, and a sampler Photo CD. It's quite a package for the money and a great add-on if you're about to purchase a CD-ROM drive.

Meridian Visual CD (Meridian Data, 800-767-2537, $69.95) is yet another CD-ROM utility that can make your computing life a bit easier. It not only catalogs your CD-ROMs and audio CDs but actually senses when you put a CD in your drive and knows which disc you've inserted. Visual CD works especially well with Photo CDs (the program automatically creates thumbnail pictures that reappear each time you insert the disc) and audio CDs (the first time, you have to tell the program the titles of the disc and individual tracks; after that, it's automatic). The program's treatment of ordinary CD-ROMs is less impressive, but if you work a lot with Photo CDs or regularly use your CD-ROM drive to play audio CDs, Visual CD could become the most popular program on your desktop.

I've tried most of the memory managers, including QEMM386, 386MAX, and DOS's own EMM386, but nothing gives me more working memory than Netroom 3 (Helix, 718-392-3100, $99). Almost anyone with a sound card and CD-ROM drive can use more conventional memory, but if you're running both and you're on a network, you may find yourself with 520K or less to run your applications. Netroom 3 provides a number of strategies—some conservative and some quite aggressive—that will help you maximize your system's memory. The bottom line: With all the other memory managers, I can't run my multimedia stuff and the network drivers; with Netroom 3, I can have it all.

Microsoft (800-426-9400) ships its new Windows Sound System 2.0 two ways: with a sound card ($219) and without ($79). The version without the sound card is a terrific addition for any sound card that doesn't already have speech recognition software. The package includes Voice Pilot, which lets you voice-activate Windows menu commands and create voice command macros, and Quick Recorder, which lets you record voice and music using two powerful compression schemes (True-Speech and ADPCM). You also receive a sleek microphone especially designed for speech recognition and a generous selection of useful sound files and utilities.

Finally, if you like to play around with sound and video, you'll love MCS SoundTrak (Animotion Development, 205-591-5715, $79.95) and 3D-IT (Electronic Imagery, 305-968-7100, $99.95). Both seem much closer to magic than multimedia utilities. MCS SoundTrak lets you add QSound to your WAV-format sound files. QSound is a revolutionary technology that adds a three-dimensional quality to sounds; you can even place individual sounds in precise positions across a full 180 degrees. 3D-IT turns ordinary Video for Windows (AVI) files into 3-D movies—the kind that require funny glasses with one red lens and one blue lens. And unlike x-ray specs, this thing really works. ❑

By Scott A. May

TOUR THE WORLD

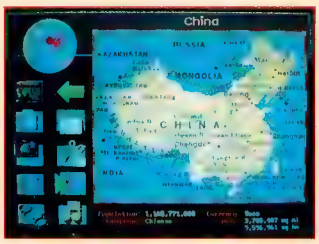
Columbus would be impressed. Magellan would be amazed. History's greatest explorers spent vast fortunes and much of their lives charting unknown destinations. Now, with less effort than it takes to lift a compass, you can visit people and places these legendary navigators never dreamed of. Through the magic of multimedia, we can all be desktop tourists and micro-Marco Polos, experiencing sights and sounds that might otherwise be unattainable. Perhaps our ancestors were right all along: The earth is indeed flat, in the shape of a compact disc.

Although several products covered here are available in both DOS and Windows versions (unless otherwise noted), we'll focus on the latter. The MPC format, by nature, is much more dynamic—taking full advantage of Windows' integrated resources for music, speech, animation, and video.

Ready to roll? Pack light—a simple mouse will do—and prepare for a multimedia journey of sight and sound.

Howdy, Neighbor!

Some of the most exotic adventures can be found in your own backyard. Provided that your backyard is in the United States, you have an abundance of choices—50, to be exact. From Alaska to Florida, Maine to Hawaii, the states offer some of the world's most diverse topography, climates, customs, natural wonders, and man-made attractions. Whether you're planning a vacation, looking to relocate, or just wanting to know more about your neighbors, now you can travel from coast to coast



World Atlas 4

and still be home for dinner.

An excellent starting point is U.S. Atlas 4 (The Software Toolworks, 415-883-3000, $59.95), an MPC version of the company's best-selling disk-based software. Bursting with interesting facts and statistical data covering more than 200 topics, the product proves to be as much of an audiovisual textbook as a multimedia travel guide. New features found in the CD-ROM edition include over 150 full-motion video clips, culled from the "America by Air" series by Douglas Kahan. Although brief and rendered without sound, the 256-color aerial footage is spectacular. Also included are more than 1000 captioned photos of scenic and historic spots, presented in slide-show format. Finally, the program offers MIDI renditions of each state's anthem, as well as digitized speech for key map pronunciations and a unique audio help feature. These multimedia goodies serve as enticements for the wealth of information contained within.

As an interactive reference guide, U.S. Atlas holds tremendous value for students, travelers, and researchers. You'll find 11 major categories—divided among national, state, and county levels—covering social, geographical, and economic data in more than 400 subtopics. The colorful presentation mix includes graphs, charts, and text, all of which can be easily cut and pasted into other Windows applications. Finally, there are maps galore: colorful topographic, highway, and presentation-style statmaps covering regional, state, county, and city levels. Special map markers let you pinpoint places of interest, while the Map Trails feature lets you create self-running slide shows with up to 50 map locations.

Whereas U.S. Atlas succeeds with its crisp academic look, American Vista (Applied Optical Media, 215-429-3701, $59.95) evokes the warmth of a well-worn, oversize parlor book—multimedia style, of course. Entirely mouse driven, the program is divided into two main chapters, States and U.S. Bookshelf, each containing deeply nested topics and submenus. Don't look for exploding windows or flashy special effects here; information is presented at a leisurely pace, one page at a time, inviting viewers to relax and browse awhile. Without question, your patience is rewarded.

Take a visual tour of all 50 states with the program's gallery of more than 1000 photographs. The images—landmarks, scenic wonders,

Astonishing Asia

and cultural attractions—are rendered in high-resolution (640 x 480) 256-color mode. Each state also features numerous maps, detailing state or regional topography, major cities, highways, national parks, and economic resources. The more fact-oriented traveler can explore the hypertext-style statistic sheets, outlining

such topics as population, politics, geography, history, economy, tourism, and trivia.

Visit the History section to hear songs from such eras as the Revolutionary War period and the Great Depression. Enter the cultural exhibit to hear dozens of songs culled from the Smithsonian Institution's Folkways Collection, representing nine distinct regions of the United States. Songs range from authentic Appalachian dulcimer melodies to Northwestern logging tunes. Perhaps even more fascinating are the lengthy samples of diverse regional dialects, from that of a New York street vendor to a Sea Islands Gullah to a native American. Both the music and the speech are cleanly recorded, offering flavorful examples of America's rich and diverse culture.

No tour of the U.S. would be complete without a visit to one of our historic and scenic national parks. Whether you're planning that next family vacation, reminiscing about a past trip, or simply in the mood for some sensational photography, National Parks of America (Multicom Publishing, 800-245-4525, $59.95) is sure to inspire. Key to the appeal of this upscale MPC product are more than 950 pictures by award-winning photographer David Muench, spotlighting 228 of the country's national parks. Subjects range from monuments and battlefields to trails, lakes, and shorelines. Muench's photos are absolutely breathtaking, showing a keen eye for natural light, color, and composition. Presented in slide-show format, the pictures can be viewed as windowed snapshots or in their full-screen glory. Also featured are 20 narrated full-motion videos, rendered in QuickTime for Windows. The program makes extensive use of MIDI background music and QuickTime's clear digitized speech.

Syracuse Language Systems' Goldilocks & the Three Bears

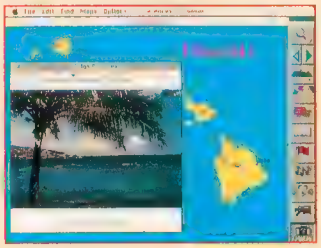
Though worthy for its stunning visuals alone, National Parks of America transcends the multimedia coffee-table level to function as a real-world travel guide. A marvelous indexing system sorts entries by region, state, park, photos, or videos, for fast and easy access. Click on the Text button within any national park to display or print details such as mailing address, phone number, directions, best times to visit, points of interest, activities, and other general information. Select the Travel Planner to search parks by state or by region; parks are sorted by more than a dozen user-defined criteria such as backpacking, boating, fishing, camping, hiking, lodging, and restaurants. National Parks of America is a majestic work that's guaranteed to stir memories and spark the urge to travel.

On the Road Again

Of course, planning a trip and actually hitting the road are two entirely different matters. Navigating America's convoluted highway system is a challenge for the best drivers; it can be a nightmare for those unprepared. You can take a sneak peek at any U.S. thoroughfare—from interstate highway to the smallest city block—with Street Atlas USA 2.0 (DeLorme Mapping, 800-452-5931, $169). Using current U.S. Census Bureau data, this amazing Windows product packs detailed maps of the country's entire roadway system onto a single CD-ROM. No town, suburb, or rural area is too remote or obscure. With lightning-fast search functions and excellent printing capabilities, DeLorme's masterpiece showcases the power and potential of CD-ROM.

The raw numbers behind the images are so mind-boggling that they bear mention. In terms of sheer size, the CD-ROM database now tops 646MB, up 166MB from the previous version. In addition to having more than 12 million street segments, the program identifies over 1 million man-made or geographical features: lakes, rivers, railroads, mountains, famous buildings, and more. Finally, DeLorme claims that if you were to print the entire U.S. map at the program's highest magnification, the results would cover more than ten football fields. Any way you add it up, this is one of the most impressive CDs on the market.

Such an overwhelming volume of numbers, facts, and figures would be meaningless without the program's remarkably succinct, intuitive interface. To locate any city or town, simply type its name in the Search dialog box and highlight the correct entry; the program instantly transports you there. Use the



U.S. Atlas 4

same process to spot specific streets or blocks, which the program labels and highlights for quick visual reference. You can even find locations based on postal ZIP codes and telephone numbers (area code and/or exchange). Mouse-driven compass movement and lightning-fast screen redraws make it easy to move in and around the maps, which zoom to 16 levels of magnification. Any closer, and you'd be brushing treetops and peeking in windows.

Once you've been bitten by the cartography bug, take your interest to the next level with DeLorme's MapExpert ($495). Now in its second revision, this massive program combines the speed and features of Street Atlas USA with a comprehensive set of professional-quality mapping tools. In addition to full search and display functions, you can now update, personalize, and customize existing maps or create your own from scratch. Has your city recently expanded? Draw in and label any new boundaries, streets, or landmarks using simple line, fill, text, and symbol tools. Add "sticky notes" to any map, useful for directions or reference markers. Although you obviously can't alter the original maps on CD-ROM, the program saves all changes to hard disk as map overlays.

Beyond the Blue Horizon

It's a small world, so they say, and getting smaller all the time. This applies not so much to geographical size as to our concept of foreign lands and different cultures. Places that once seemed very far away and out of reach now seem close by. The idea of a world community has become a reality. Now, through the magic of multimedia, anyone can travel this shrinking globe and visit places that were once only a distant dream.

The first stop on our globe trotting tour is Great Cities of the World (InterOptica Publishing, 415-788-8788, $49.95), a dynamic MPC travel guide to ten of the world's most exciting places: Tokyo, Rio de Janeiro, Sydney, Moscow, Los Angeles, London, New York, Cairo, Paris, and Bombay. Each location features several minutes of atmospheric video, plus a narrated slide show with dozens of dazzling full-screen photos. Both text and speech can be configured to English, Spanish, or French.

The product succeeds best as a multimedia diplomat, providing basic valuable background information about currency, history, language, and time zones, as well as useful phrases. Other detailed topics of information include recreation, restaurants, hotels, culture, sights, transportation, shopping, and travel planning. There's even a quiz to test your knowledge of each city. InterOptica's programming is exceptionally smooth, giving the program a relaxed pace and distinct international feel.

Two more general-purpose reference guides are World Atlas 4 (The Software Toolworks, $69.95) and World Vista (Applied Optical Media, $59.95). Both products sport functions and features that are identical to those of their American counterparts, described earlier. Like U.S. Atlas 4, World Atlas 4 takes more of a textbook approach to its subject; it's filled with maps, stats, graphs, charts, and current census figures for more than 200 countries. Aesthetically, however, the program boasts some of the genre's best full-motion video clips (150 in all), together with authentic digitized recordings, more than 1000 color photos, and hundreds of digitized speech samples.

World Vista features the same structure and programming style of its American cousin. The product's major attractions are its hundreds of full-screen photos and its map system, scanned from Rand McNally originals. The designers use overscanned windows to display seamless maps at full scale, scrolled across several virtual screens.

Reach Out and Access Someone

Whoever coined the slogan "Let your fingers do the walking" was a true visionary. Why waste time and energy driving when you can instantly reach your destination via telephone? Now, paired with personal computers and CD-ROM technology, the telephone has become an even more powerful travel tool.

Take your first step down the information superhighway with SelectPhone (ProCD, 800-992-3766, $299), a DOS-based program featuring the residential and business white pages telephone listings for the entire U.S.—more than 80 million listings—on four CD-ROMs. High-speed search functions locate listings by name, address, or telephone number. Business listings can also be searched by SIC (Standard Industrial Classification) codes, business headings, and name. Output single listings or entire cross-indexed search results to disk or printer. If your computer is equipped with a modem, you can even autodial any selected listing. All told, the CD-ROMs contain more than 5GB of compressed data.

Travelers can locate hotels, restaurants, and attractions—or simply look up old friends. Combined with mapping software such as DeLorme's Street Atlas USA, the size and scope of this informational database is astonishing.

Keep in mind that the product contains only those listings previously published in book format. The publisher notes that an estimated 25 percent of all published directory listings change during the course of any 12-month period. The system is remarkable, but not perfect. Most users will eventually spot omissions, largely due to still-evolving methods of data gathering. Updates are offered to registered users at substantial discounts.

For the environmentally aware, the publisher notes that the equivalent information in paper form would total nearly 10,000 books, or approximately 100 trees. Multiply this by thousands of end users, and those shiny plastic discs are suddenly quite earth-friendly.

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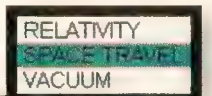

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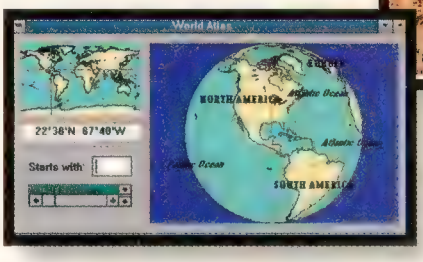

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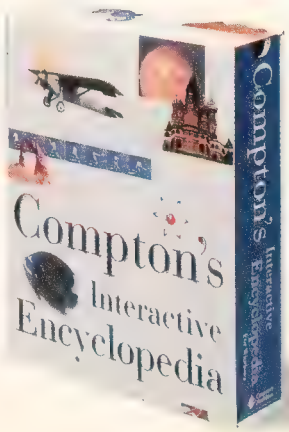

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COMPUTE CHOICE AWARDS

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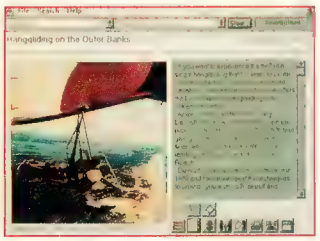
Digitized sound also plays a big role, evidenced by the wide array of traditional music (courtesy of the Smithsonian's Folkways Collection) and language samples. Simply pick a common phrase and then click on 1 of 210 countries to hear it spoken. With few exceptions, the program makes no distinction between language and regional dialect. Elsewhere, the atlas offers a more traditional cross-referencing of facts, figures, stats, and assorted graphic treasures.



Adventures

DeLorme goes international with its Global Explorer ($169), an ambitious combination of map collection, world atlas, and travel guide. This Windows CD-ROM offers seamless, full-color maps of the entire world, rendered at various levels of detail. More reference-oriented than the company's street-mapping products, Global Explorer focuses less on navigation than on cultural, geographical, social, and historical features. Large map icons are linked to descriptive text windows, highlighting current facts and figures for more than 20,000 locations. As you'd expect from DeLorme, all maps provide labeled roads, railways, and topographic features, and they zoom down to street level in all major world cities.

When you get that itch to travel, Adventures (Deep River Publishing, 207-871-1684, $49.95) will do almost everything but pack your bags and buy the airline ticket. The ultimate vacation reference guide, this fun, fact-filled CD-ROM will inspire you with detailed accounts of more than 1000 worldwide adventures. Pull-down menus let you pick through 29 main categories of activities ranging from aerial sports to youth programs. Selecting a category reveals dozens of unique vacation getaways throughout the world, with thousands of exquisite photos, 76 full-motion videos, and lengthy text descriptions. The program will even tell you whom to contact, the best times of the year to go, costs, difficulty levels of the various activities, and whether the trip is suitable for children. The Windows interface is fast and clean, highlighted by one of the best cross-referenced search engines in the business.

Many MPC travel guides focus on specific regions—for example, InterOptica's Mount Everest ($24.95) and Astonishing Asia ($49.95). The first title, produced in conjunction with the Sierra Club, teaches ecological awareness while it entertains and informs. Standout features include glossary, maps, photos, full-motion video, and hypertext-style text with direct links to animated illustrations. Although not as large in scale or as visually dynamic as most InterOptica titles, the Mount Everest program scales its towering subject with thorough, sure-footed authority. Astonishing Asia, on the other hand, must surely rank among the most unusual and visually stunning of any of the products mentioned here. Featuring more than 30 minutes of video and 600 pictures by photojournalists Earl and Nazima Kowall—some never before seen by Western eyes—this title offers a firsthand look at more than 44 themes in nine categories. Experience bizarre rituals, festivals, death rites, religious ceremonies, and much more. The mood is dark and forbidding, thanks in part to Louis Roth's expressive narration and Ken Andruk's ethereal soundtrack. Exotic, to say the least, this incredible journey should not be missed.

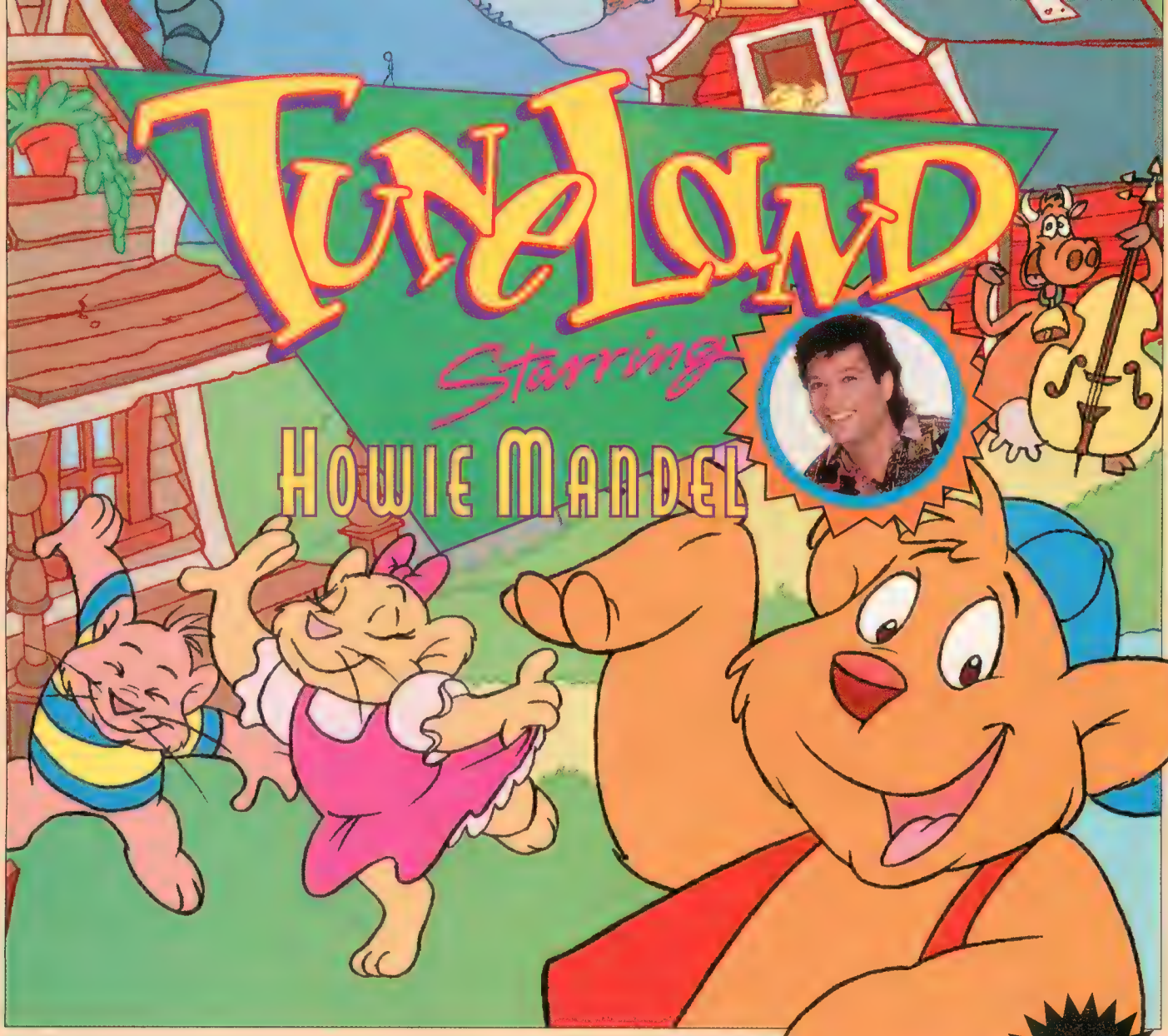
Speaking of Travel

Once you've decided where to go, crossing borders is the easy part; getting past language barriers often proves more daunting. Luckily, this is one area where multimedia teaching tools really shine. The growing number of high-quality MPC language products is sure to bring smiles to many weary travelers.

A great place to begin is the Introductory Games series from Syracuse Language Systems (315-478-6729). This series offers titles in Spanish, French, German, Japanese, and English ($69.95 each). Each features 27 games, such as concentration, jigsaw puzzles, counting, and Simon says, to teach hundreds of words and expressions. Students learn by total language immersion—interactive reinforcement, with no translations—helped by excellent digitized voices and colorful graphics. Although designed for children ages 4 and above, these products are quite suitable for beginning teens and adults. In a similar vein, Syracuse offers its Triple Play series, currently available in Spanish, French, and English ($89.95 each). Designed for intermediate users ages 9 through adult, the programs contain dozens of amusing games, teaching more than 1000 words and phrases in three levels of learning difficulty. A unique feature is the ability to record and play back your voice to compare it with the narrator's.

Street Atlas USA 2.0

For more advanced language skills, turn to the impressive HyperGlot (615-558-8270) line of MPC products, such as the self-study Berlitz Think & Talk series for Spanish, French, German, and Italian ($199 each). These multivolume sets (seven to nine discs per package) offer 50 interactive lessons of total language immersion. Although not particularly flashy, HyperGlot's presentation style is smooth and effective, with CD audio of unequaled clarity and featuring authentic native speakers and 10,000-word online dictionaries. Other excellent HyperGlot multimedia products include the Learn to Speak series in Spanish, French, and English ($99 each), featuring two-disc, first-year language courses of 30 or more context-intensive lessons. Once again, the program succeeds by immersing students in role-playing conversations and interactive simulations, including MPC recording and playback sessions.❑



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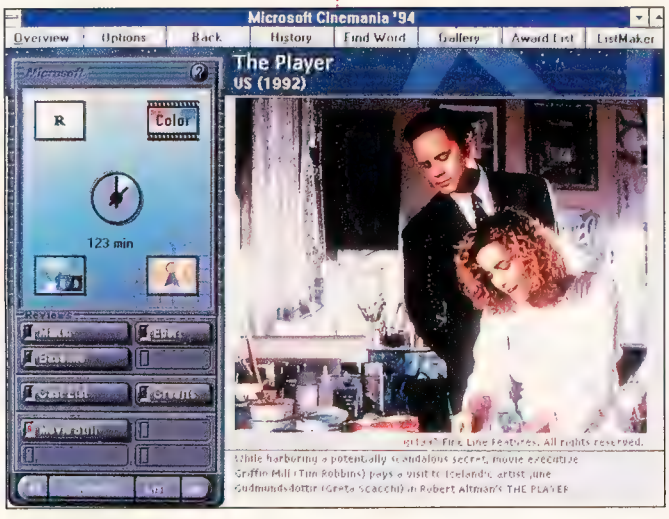
Circle Reader Service Number 152

NEW MULTIMEDIA PRODUCTS

EDITED BY POLLY CILLPAM

Crazy About Movies

How about a complete interactive movie guide at your fingertips? The latest version of Microsoft's Cinemania includes reviews by Roger Ebert, Pauline Kael, and Leonard Maltin, with topical articles by Ephraim Katz.



Microsoft Cinemania '94 includes reviews and film clips.

Interactive hypertext, original lines of famous dialogue, video clips, and classic music bring the film world to life. Microsoft Cinemania '94 has film reviews; biographies of movie stars, directors, and other Hollywood personalities; complete listings of all Academy Award nominees and winners; topical articles; and enhanced multimedia elements. In addition, there are high-quality movie stills, portraits of famous screen stars and other industry figures, video clips from classic films, and movie themes and songs.

With an easy-to-use interface that resembles a remote control, users can explore movies by genre, actor, director, star rating, release date, Academy Awards, and even MPAA rating with the click of a button. You get the updated text of Leonard Maltin's *Movie and Video Guide 1994,* which includes more than 19,000 movie reviews; more than 800 detailed movie reviews from *Baseline's Motion Picture Guide;* and nearly 4000 biographies of movie personalities. Also featured are the 1994 edition of Roger Ebert's *Video Companion,* 2500 film reviews from Pauline Kael's *5001 Nights at the Movies,* and biographies and topical articles from Ephraim Katz's *The Film Encyclopedia.*

Relive classic scenes from your favorite movies with 20 full-motion video clips, audio clips from more than 100 movie themes and songs, and three times as many motion picture stills and twice as many biographical photos as were found in the previous version. Once you've selected a movie, you can use the list-making feature to make notes or print out a list to take with you to the video store.

Finding great movies to watch has never been so easy.

Microsoft
(206) 882-8080
$79.95
Circle Reader Service Number 530

Turn Your PC into a Theater

Media Vision has a multimedia upgrade kit that does just that! Plus, it doubles as a stand-alone audio compact disc player.

The Memphis multimedia upgrade system simplifies the installation process and gives consumers an integrated unit for CD-ROM access. It can play audio CDs while the PC is turned off—even if the Memphis unit is separated from the PC. "It represents a major step forward in Media Vision's drive to bring affordable multimedia products to the mainstream," says Paul Jain, Media Vision's president and CEO.

The Memphis system consists of a chassis with controls for the CD-ROM drive, two detachable speakers, an interface card that installs inside your PC, a selection of CD-ROM titles, and all required cables. You can install and configure the interface card, using Media Vision's QuickStart software, or have a local dealer do it for you. Assembling the multimedia theater is as easy as connecting stereo components. If space is limited, the speakers can stay attached to the chassis, and the entire unit can be placed under the computer monitor. If you have more space to work with, you can place the speakers as much as 12 feet apart. For stand-alone audio CD operation, simply plug the power cord of the chassis into any AC socket. It doesn't need to be connected to your PC.

The Memphis comes bundled with several top-selling multimedia titles on CD-ROM, including Arthur's Teacher Trouble and Compton's Interactive Encyclopedia.

Media Vision
(510) 623-5856
$999
Circle Reader Service Number 531

Big Things in Small Packages

New Media has recently introduced two multimedia PCMCIA cards. The Visual Media SCSI is the world's first SCSI adapter for mobile computing applications. It provides portable-computer users with easy access to CD-ROMs, scanners, printers, cameras and tape drives, expanding the portable computer's capabilities to match those of desktop machines.

Visual Media SCSI

The Visual Media SCSI, which ships with New Media's plug-and-play ASPI manager as well as CorelSCSI software, offers

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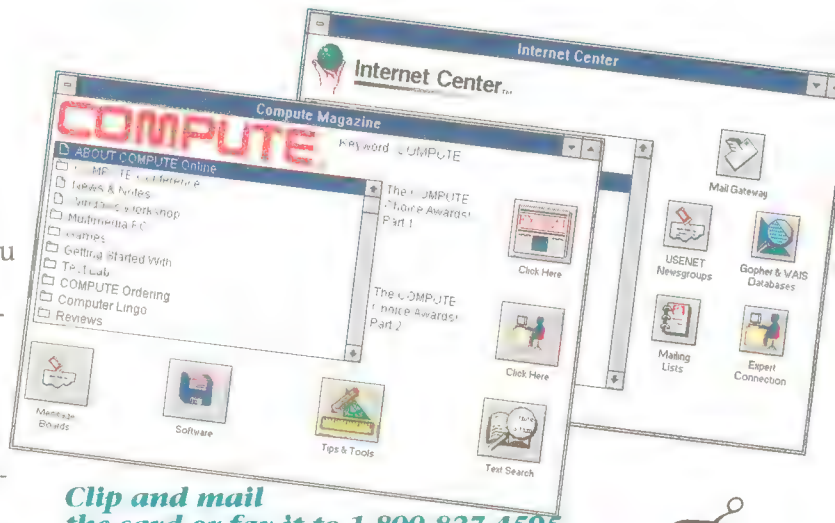

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Sound Galaxy Double Speed PRO 16 Multimedia Kit

users flawless installation with no jumpers to adjust and no need to know detailed information about the SCSI peripherals. New Media's installation disk handles all the details.

In addition to being easy to use, the Visual Media SCSI produces throughput rates over 200 percent faster than parallel port adapters, the current standard used for connecting peripherals to portable computers. The increased throughput is an important feature for multimedia applications that can't tolerate an interruption in the data stream.

In other news, New Media and Microsoft have joined to offer a PCMCIA 16-bit stereo sound card called the .WAVjammer. This card is bundled with Microsoft's Windows Sound System 2.0 and New Media's plug-and-play device drivers. It offers 16-bit stereo recording and playback, voice recognition, and voice annotation in a credit card–sized package. It's the first product of its kind designed for presentation audio, voice navigation, and multimedia applications on laptop and subnotebook computers. It fits into a standard Type II PCMCIA slot and can be inserted or removed at any time.

New Media
(714) 453-0100
$339—Visual Media SCSI
$399—.WAVjammer
Circle Reader Service Number 532

Double Your Fun

The Sound Galaxy Double Speed PRO 16 Multimedia Kit is Aztech Labs' first multimedia upgrade kit with a double-speed CD-ROM drive and 16-bit sound card, and it's fully MPC-2 compliant. With it you get five popular CD-ROM titles, 16 bundled programs , and a free CD-ROM carrying case. "We developed this product for consumers who want a high-quality and high-value multimedia upgrade to their PCs, as well as distinguishing features such as voice recognition software," says Michael Mun, president of Aztech Labs.

The kit features the new Sound Galaxy PRO 16L card, which includes an MPU-401– and Sound Blaster–compatible MIDI interface that can transform your PC into a professional playback-and-recording MIDI studio. The sound card supports the Sound Blaster Pro, Microsoft Windows Sound Systems, and Ad Lib sound standards; has a stereo mixer allowing the user to record from multiple sources; and can be upgraded.

The five CD-ROM titles are Software Toolworks Encyclopedia, Jones in the Fast Lane, Macromedia Action!, Battle Chess Enhanced, and Space Quest IV.

Aztech Labs
(510) 623-8988
$599
Circle Reader Service Number 533

Movie Star Panorama

Enjoy Hollywood movies? Learn more about the stars who make them with Hollywood: The Bizarre. Based on *The Hollywood Death Book*, by James Robert Parish, the CD-ROM portrays the often–sordid lives and deaths of famous movie stars. There are more than 150 biographies of stars and a list of more than 5000 Hollywood figures who have died. You can look up stars who died in obscurity (including Clara Bow, Mae West, and Mary Pickford), stars who were murdered (including Thelma Todd, Sal Mineo, and Sharon Tate), stars who died of alcohol or drugs (including Nick Adams, John Barrymore, John Belushi, Judy Garland, Bela Lugosi, and Peter Lawford), and stars who died mysteriously (including Bruce Lee, Marilyn Monroe, Mario Lanza, Elvis Presley, and Natalie Wood). In addition, the CD-ROM contains nine full-length books that detail the lives and deaths of the great movie figures.

The disc includes over 400 black-and-white and color photographs—many from private collections. There's also an audio of Marilyn Monroe's rendition of "Happy Birthday, Mr. President," which she sang for President Kennedy. It's just one of many sound clips from a myriad of performing stars.

ScanRom Publications
(516) 295-2240
$69.95
Circle Reader Service Number 534

Media Vision's Memphis multimedia upgrade kit

MULTIMEDIA SPOTLIGHT

By Richard O. Mann

THE NEW KID ON THE BLOCK

Jack Prelutsky's brilliant volume of humorous poems, *The New Kid on the Block,* adds a new dimension to Brøderbund's award-winning Living Books series of kids' books on CD-ROM. Mom and Dad will get as big a kick out of this one as the kids. At the same time, Brøderbund's sparkling adaptation of the poems to the multimedia screen adds a new dimension to the printed book.

You're going to like this one. I love it, my kids love it, and you'll love it. One warning, though: The CD-ROM and the printed book that comes with it include only 18 poems, a small fraction of the printed book's pages. You won't be able to help yourself—you'll have to rush out and buy the book, too, to get the rest of these great poems.

Prelutsky writes whimsically funny verse for kids of all ages. His acute sense of the musical sound of words and his masterful use of rhythm and rhyme make his poems cry out to be read aloud—as they are on this CD-ROM. If that were all, it would be a fine product, but, of course, that's not all.

This is a Living Book, one that starts with pages from a book and then adds voice, animation, music, and color. The printed book features engagingly simple illustrations by James Stevenson. Starting with these black-and-white line drawings and four lines of verse per screen, the poems come to life. A reader—Prelutsky himself on four of the poems—reads the words with appropriate expression while the drawing becomes animated to illustrate the words. In "When Tillie Ate the Chili," you see dragonlike flames coming out of Tillie's mouth, smoke coming from her nostrils, and steam coming out of her ears as the lines are read. These animations add judicious bits of color, sound effects, and music.

There's more than that to this Living Book, however. They call it interactive poetry. You can have the poems read to you, or you can play in the poems. In this latter mode, the reader performs the lines onscreen, and then you can explore. Clicking on objects onscreen usually brings out some brief but interesting or funny action. Clicking on the words in the text gets you the word spoken by the reader and often some new animated action in the illustration.

The latest Living Book from Brøderbund Software

For example, let's consider the poem titled "The Diatonic Dittymunch," about a wacky creature that plucks music from the air and eats it. It swallows symphonies, sonatas, and cantatas. It makes ballads into salads and consumes them note by note. It eats marches, mazurkas, rhapsodies, reels, minuets, tarantellas, and even a three-act opera.

Click on the word *rhapsody,* and it floats onto the screen in a large, flowery script, accompanied by a few bars of an unmistakable musical rhapsody. The diatonic dittymunch manages to swallow the drifting word and the accompanying music, of course. In "Forty Performing Bananas," I learned the musical differences of cha-chas, fandangos, tangos, mambos, sambas, and waltzes. I'm not sure the antics of the 40 bananas will help you later distinguish between a samba and a cha-cha, but they're sure fun to watch.

There are hours of fun here, hearing and enjoying the poems and listening to Prelutsky sing one of his poems, "Alligators Are Unfriendly." He sings to entertain you if you take too long deciding which poem you want to hear next. As with any masterwork, every element of this program is consistent with the whole. The credits even roll to animations and an original piece of music.

The New Kid on the Block is available for MPC/Windows and CD-ROM–equipped Macintosh computers. It requires at least 4MB of RAM, but even on my local-bus 66-MHz 486DX2 with 8MB of RAM and a double-speed CD-ROM drive, it takes several seconds to move from page to page, even when only the four lines of text change. On slower equipment, the lack of speed might be a problem.

Although it runs under Windows 3.1, New Kid isn't a typical Windows program. The manual cautions you not to run other tasks simultaneously—New Kid needs all the resources. Once the program starts, it doesn't use the Windows interface at all. Its own full-screen, mouse-based interface is simple, but not totally without frustrations. You have to read the little manual to find out how to exit a poem and go back to the initial screen (click on the page number or hit the space bar), for example.

There are only three kinds of people: Prelutsky fans, those who will be Prelutsky fans when they are exposed to him, and people with no sense of humor at all. Unless you're unfortunate enough to be in the last group, get yourself down to the software store and buy this CD-ROM.

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PRODUCTIVITY CHOICE

This latest upgrade makes managing your finances easier than ever.

Richard Mann

QUICKEN 3 FOR WINDOWS

It's no accident that Quicken has outsold all of its competitors combined over the last ten years. Produced by Intuit, a company possessed by an obsession to make things easy to use, Quicken is tempered with a healthy dose of common-sense understanding of what real people want and need in a financial package. Quicken 3 for Windows, the latest version, upholds this proud tradition with helpful new features and a Windows interface so effortlessly elegant that you'll wonder why others don't match it.

For those of you who've never heard of Quicken, here's an overview of its wonders. If you can write a check and fill out a standard check register, you can use Quicken. It puts your checks and register on the screen—they look just like your checkbook. It takes over every manual process possible, including printing checks, adding and subtracting balances, balancing your checkbook, and summarizing your information into reports, graphs, and tax-return information. It takes all your financial matters firmly in hand, making it easy for you to cope with everything—if you can exercise the discipline to regularly record everything in the computer.

And it does all this with superb ease. Quicken is unfailingly comfortable, intuitive, and easy to understand.

To demonstrate the lengths to which Intuit is willing to go to make things easy for you, consider the Quicken VISA card, introduced with last year's Quicken versions. Using a special VISA card, you get your monthly VISA statement on disk or via modem in Quicken-ready format. Vendors, dates, amounts, and even your categories are already recorded: Just feed the file into Quicken, and your data entry is done. No competing product has attempted to match this coup.

You could summarize most of the new features in Quicken 3 by saying that it does almost everything easier, faster, and better. Take as an example the screen's appearance. The control buttons sport large, colorful, consistent symbols with text labels—you'll never have to wonder how to leave a window. A new button bar rides the top of the check register to make copying, deleting, and inserting data child's play. Throughout the program, all icons appear on buttons that include text labels—none of those button bars that leave you guessing what all those tiny icons do. With Quicken, everything is perfectly clear.

The financial calendar is the most noticeable new feature. It gives you a place to record payments you'll make in the future. In previous versions, to schedule a future payment, you added it to your check register with a future date—an unsatisfactory solution for many. It's no fun to search for your current balance in the middle of a check register.

The calendar removes all of those as-yet-unwritten checks from the check register and into a graphic monthly calendar. There, they're stored until you're ready to write or record them.

When a check's scheduled pay date arrives, Quicken prompts you for a payment decision. If you're ready to pay, it posts to the register and reminds you to write the check. If not, it keeps the item on the calendar until you're ready to pay. Or, if you know you'll want to make the payment on schedule, you can set it for automatic payment, requiring no intervention.

If you put your incoming earnings on the calendar with your planned expenditures, Quicken will draw a graph of your projected daily cash balances. You can see when your checking account will go negative—unless you spend less or earn more. The calendar can also store color-coded text notes for each day.

Earlier versions of Quicken have investment tracking, but the feature seems more of an afterthought than an integral part of the program. Not so with Quicken 3. Six useful views of your investment portfolio offer 18 performance measures, including estimated income, market value, percentage changes, and investment yields. Getting investment information into Quicken has been difficult in the past, but the new entry forms in this version simplify things considerably.

The reporting function has improved from good to excellent, with more standard reports, easy customization, and onscreen previews. Loan-analysis tools have been beefed up and simultaneously simplified. New savings goal accounts earmark funds to save for future goals, such as major purchases, college costs, and retirement. These funds appear to be set aside where you can't spend them, even if they're really in your normal accounts.

Research indicates that the one thing we all hate about finance programs is the drudgery of data entry. Quicken does everything possible to reduce the pain, from drag-and-drop calendaring of payments to QuickFill's intelligent guessing at what you're going to type and pull-down lists in every possible field. Amount fields have a quick calculator attached; date fields allow you to pop up a minicalendar to point to the date you want. Little bits of simplification and automatic computer assistance are peppered throughout the program; many are so natural that you won't notice they're new.

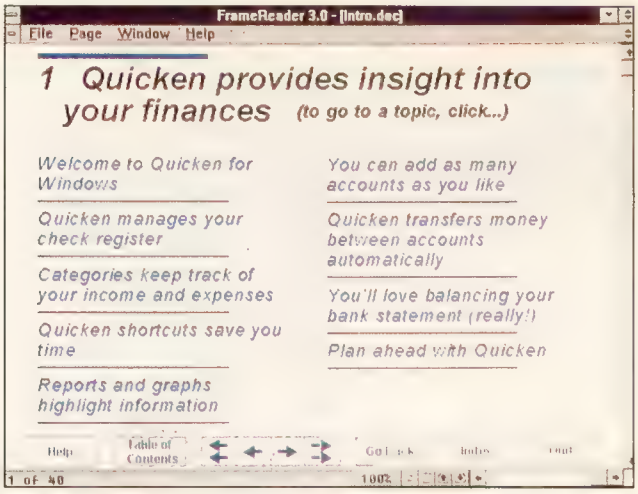
If all the features of Quicken 3 aren't enough, you can purchase Quicken Companion 2 for Windows, which adds several extremely useful new modules. Its Quicken-style custom database helps you inventory your home for insurance purposes. And Quicken Tax Estimator calculates your taxes using the new tax law and lets you change rates as the laws change. Investors can use Quicken Quotes to go online to retrieve current stock quotes, which then post to Quicken's investment files. The Quicken Tips section offers expert tips on using Quicken in new ways, shortcuts and timesavers, and ways to customize the program to suit your individual needs. It's a treasure trove of eyeopening ideas and techniques.

Never one to pass up new technology, Intuit has jumped headfirst into the CD-ROM multimedia arena with its new Deluxe Edition. It includes The Wall Street Journal Video Guide to Money and Markets, The Wall Street Journal Personal Finance Library, The Tradeline Electronic Stock Guide, and 22 government consumer publications.

The Video Guide includes small windows of full-motion video wherein experts explain various financial topics. The Personal Finance Library offers excellent advice on planning your future, including several interactive pages where you calculate mortgage statistics or a wise investment mix.

The Tradeline Electronic Stock Guide is excellent, offering detailed information on over 6000 publicly traded stocks to help you with your investment research.

The CD-ROM version of Quicken 3 also includes Quicken Companion 2 for Windows, along with electronic versions of the manuals for both Quicken 3 and Quicken Companion. (You can send for printed manuals separately if you desire.)


FrameReader 3.0 - [intro.doc]
File Page Window Help
1 Quicken provides insight into your finances (to go to a topic, click...)
Welcome to Quicken for Windows
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Reports and graphs highlight information
You can add as many accounts as you like
Quicken transfers money between accounts automatically
You'll love balancing your bank statement (really!)
Plan ahead with Quicken
Help
Table of Contents
1 of 40
100%

Quicken 3 is both a simple, easy-to-use checkbook program and a powerhouse of sophisticated financial capabilities—in one box. Those wanting the simple program won't be put off by complexities: Quicken has always had a knack for keeping the advanced stuff out of your way until you need it.

In short, I predict that Quicken 3 for Windows will retain Intuit's traditional stranglehold on the personal finance software market. Quite simply, it's just unbeatable. ❐

Circle Reader Service Number 391

Quicken 3 for Windows: IBM PC or compatible (80286 compatible), 2MB RAM, hard drive with 5MB free, printer, mouse, Windows 3.1—$69.95

Quicken Companion 2 for Windows—$34.95

CD-ROM Deluxe Edition: IBM PC or compatible (80386 compatible), 4MB RAM, 256-color SVGA, hard drive with 10MB free, MPC-compatible CD-ROM drive, sound board, Windows 3.1, MSCDEX 2.2—$124.95

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ART WORKS

Robert Bixby

"Art Works" scuttles across the floors of sunless seas this month in search of hidden treasure.

THE COOLEST MONTH

English majors will remember that hipster T. S. Eliot (in his most ambitious poem, "The Waistband") pronounced April the coolest month, and in that spirit, this slightly fragmented column will attempt to cover some of the coolest things happening (without forcing its author to create any particular thread of meaning where none now exists).

Not only can Mastersoft's Word for Word now translate virtually any application's files into virtually any other application's format, but it can also translate graphics within those files into a graphics format friendly with the file format into which the file is being converted. And if you think that sentence was hard to read, you should have seen the effort it took to write it. If you regularly (or even occasionally) translate files from, say, WordPerfect to Word for Windows, you should take a look at Word for Word (Mastersoft, 8737 East Via de Commercio, Scottsdale, Arizona 85258; 602-948-4888).

GeoWorks has been busy selling hardware makers on its operating system. The Zoomer, marketed by Casio and Radio Shack, has GeoWorks at its heart, and Canon has licensed GeoWorks to operate a self-contained publishing engine expected to be similar in size to the dedicated word processors marketed by Smith Corona, Brother, and Canon, but with a GUI, GeoWrite, and a built-in ink-jet printer that will allow you to carry desktop publishing around with you. I don't know whether the machine will be battery powered, but if it is, we may be witnessing the predawn glow of laptop publishing.

We've seen an explosion of interest in ink-jet printers, which can now be found in laptop computers (from Canon) and fax machines (from Ricoh—check the April "Personal Productivity" column—available only in the COMPUTE area on America Online—for a review), so it shouldn't be a surprise that someone would introduce special paper to make ink-jet output particularly sharp and bright. Micro Format (830-3 Seton Court, Wheeling, Illinois 60090; 800-333-0549) has come up with paper that makes ink-jet printouts look brilliant. If you're using your ink-jet printer for desktop publishing, you can create better originals with the Micro Format paper, known as SUPERCOLOR Ink Jet Paper.

Wish list: Here's a free idea, given gladly to anyone who wants to develop it. Why not cross a plotter with a laser and come up with a nonimpact paper cutter? The bed of the cutter could be ceramic so the powerful beam wouldn't cut through it. The unit would have to be carefully shielded, perhaps enclosed in a cover with an interlock (like a microwave's or a CD player's) that would prevent it from operating when open. And it would have to be vented to prevent a concentration of vapors.

This machine could be used by the desktop publisher to trim the rough edges of booklets and to make die cuts. Kids could use it on paper, cloth, and leather to make crafts (with careful adult supervision). Although lasers have made their way into our homes via CD players, this would be the first home use of a really powerful laser.

A word of caution: If you manufacture this item, get loads of liability insurance because you know that some hacker somewhere will defeat the interlock and end up cutting off his pinkie or blinding himself and he'll get a good lawyer to convince a jury that it's your fault and you'll wind up a pauper on skid row telling passersby the sad story of your wasted life. Nonetheless, entrepreneurialism *is* the mighty engine that drives our economy.

Victor Zinn of Boca Raton, Florida, wrote to ask why GeoWrite (under GeoWorks 1.2) has trouble printing on legal-size (8½- × 14-inch) paper: "Three inches of the right-hand side was transferred to a second page." This confusing tendency of GeoWrite to give legal paper short shrift is caused by a setting in your Preferences application. To print on legal-size paper, pull down the File menu in GeoWrite and select Page Setup. From the options in the dialog box that appears, select Legal Paper. Close the dialog box, start up Preferences, and click on Printer. In the dialog box that appears, click on Defaults. In the dialog box that opens, select Legal-Size as the printer default and close all of the dialog boxes and the Preferences window. There are few things about GeoWorks that deserve to be called goofy, but I've never seen a goofier method for changing page setup. A prized COMPUTE hat goes out to Mr. Zinn for writing to us about his problem.

Have a DTP tip you'd like to share? Let me know about it by calling (900) 884-8681, extension 7010203 (sponsored by Pure Entertainment, P.O. Box 186, Hollywood, California 90078). The call costs 95 cents per minute, you must be 18 or older, and you must use a touch-tone phone. Or write to "Art Works" in care of this magazine. And if you don't have a tip, call to let me know what you're up to, what software you're using, and how I can be of help. ❐

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FRACTAL DESIGN CORPORATION

Circle Reader Service Number 140

DISCOVERY CHOICE

Here's a game that makes it fun and exciting to solve equations and easy to understand math concepts.

Clayton Walnum

MATH ACE

Math programs have been trying to teach children (and adults) about numbers almost since the first personal computer landed in the home. These math programs have covered all the bases from simple flash-card drill-and-practice programs to games. What few math programs have accomplished so far, however, is making math really fun—creating an addicting yet educational product. Math Ace from Magic Quest accomplishes this difficult feat.

In Math Ace, you're charged with destroying a virus that's running rampant in a grid of microchips. The longer it takes you to solve a series of math problems, the more microchips the virus munches into silicon dust. If the virus manages to eat its way all the way to the edge of the grid, you lose. Over the course of your virus stomping, you'll get a chance to play four subgames, all of which cleverly introduce you to various mathematical concepts. They really make you think, but you're having so much fun trying to stop the virus that you don't notice how hard you're working.

The game begins with a grid comprising 80 microchips. Several virus eggs are located in the grid, with one hatching immediately. The object is to enclose the virus with robot shields so the virus cannot chew its way to the edge of the grid. You accomplish this by selecting a chip on the grid and the direction in which you want the next set of three shields to be built. Then, if you successfully answer a math problem, the shields, which the virus cannot penetrate, are placed on the grid. Once you've surrounded the virus with shields, you advance to the next level, which features more viruses and tougher math problems to solve.

Of course, complications abound. First, because the game runs in realtime, you must answer math problems as quickly as possible. The longer it takes you to solve problems, the more chips the virus will chomp. Second, the virus doesn't sit back and let you build shields without a fight. Often, when you select a chip, the virus challenges you to a duel. If you complete the duel successfully, then one of the virus's eggs is destroyed. Otherwise, if you lose the duel, another egg hatches, leaving you to contend with multiple viruses.

A duel features one of the four subgames mentioned previously. Depending on the level, a duel may be a game of Angle Cannon, Bubble Gum Machine, Hide and Seek, or Function Shoot.

In Angle Cannon, the virus moves in a repeating pattern on the screen. You must enter at an angle to set your cannon and then fire at the virus. You have only three shots with which to hit your target.

The Bubble Gum Machine subgame does a terrific job of teaching probabilities. When it begins, a gumball machine fills with red, blue, and yellow gumballs. Surrounding the gumball machine is a simple playing board. The virus and your token take up their respective starting positions. To move your marker, you first select a token for the number of moves you want to make, from one to five. Then you select the color of gumball you believe is most likely to drop from the machine. The more balls of one color in the machine, the more likely that color of gumball will be dispensed. Guess correctly, and your marker moves forward on the board the number of spaces represented by the token. Guess incorrectly, and the virus moves instead.

In Hide and Seek, you're presented with a four-quad-

rant grid like that used for graphing functions. As is typical with a graphing grid, the values on the *x*-axis and *y*-axis are marked in both negative and positive numbers. You select the point on the grid where you want to hide; then the virus chooses its hiding place. You and the virus then take turns entering coordinates in the grid in an attempt to locate each other.

Last, but definitely not least, Function Shoot gives you a chance to show off your understanding of function graphing. This time, a real graphing grid appears on the screen, with the virus visible somewhere in the grid. The program gives you a function, and you must then provide values for the function's coefficients. After you've entered the coefficients, the program graphs the function on the grid. If the graph line hits the virus, you win. You are allowed to adjust the function's coefficients three times before the virus automatically wins the duel.

Each one of the subgames does an excellent job of presenting difficult math concepts in an interesting and understandable way. Most important, they're all fun!

If you feel you're not quite ready to jump into a full game or if you just want to review your math without the pressure of a ticking clock, you can enter Math Ace's Smart Lab. In the Smart Lab, you can choose any type of problem from any level in the game. The available topics include Basic Concepts, Arithmetic, Real World, Charts/Graphs, Probability, Geometry, and Algebra.

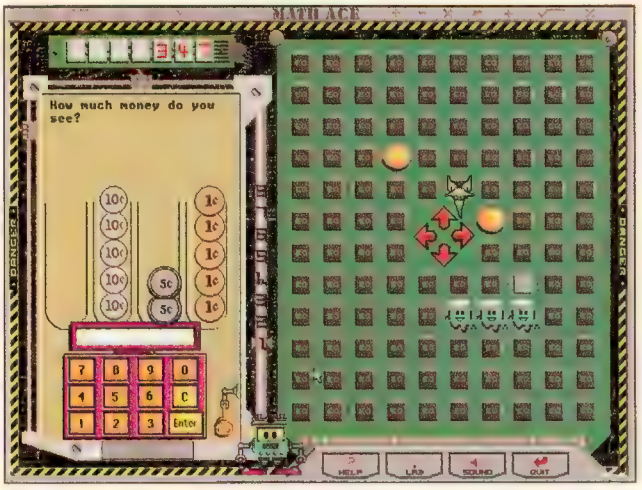
Besides offering you the problems to solve, the Smart Lab also features an online reference book that includes information on everything from simple arithmetic to trigonometry and calculus. Plus, you can learn about other number-related topics such as numbers in foreign languages, weights and measures, time, abbreviations, and money exchange rates.

In fact, these extra topics are what keep Math Ace interesting. In one problem you may be asked to estimate the percentage represented by a fraction, while in the next one you may be asked how a half note in a musical score relates to a quarter note. Often, these real-world questions have little to do with arithmetic; instead they present an interesting fact about the world. This shows how numbers play a role in the real world. Languages get good coverage here, including not only French, Spanish, German, and Japanese, but also Braille and Morse code.

No matter whether kids are playing the main game, are engaged in a duel, or are just practicing in the Smart Lab, they'll delight in Math Ace's detailed graphics and entertaining sound effects. The game boasts a cornucopia of digital sound effects, including everything from simple clicks and pops to explosions and voices. One thing's for sure: Kids will want to crank up their sound cards when playing Math Ace.

If Math Ace has a problem, it's that it tries to present too wide a range of material in each of its two difficulty levels. For example, a child who chooses the Prodigy (easier) level must, in order to win all eight levels of the game, answer problems ranging from basic arithmetic all the way through simple geometry. To win at the Ace difficulty setting, a child must be able to handle problems ranging from dividing decimal numbers to factoring polynomials and graphing equations. In other words, only children of the highest age recommended for each of the two difficulty levels—or extremely gifted youngsters—are likely to be able to finish the entire game.

Despite this slight design



flaw (and the fact that the darn angle cannon doesn't seem to shoot straight), Math Ace is a clever and an effective math tutor—perhaps the best program of its kind available. Both you and your children can expect to spend many happy hours with it, stomping out nasty computer viruses while at the same time building up mathematical skills woefully lacking in too many people today. Quite simply, by meeting the challenges in Math Ace, your children can finally learn the difference between an exponential function and *TV Guide*. And that's important. ❐

Circle Reader Service Number 392

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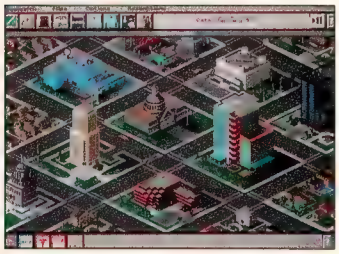
GAMEPLAY

Denny Atkin

SIM HILLARY

A computer game that's educational, socially relevant, *and* entertaining? That's what Maxis and The Markle Foundation have created with SimHealth: A Democracy and Society Computer Simulation. SimHealth puts you behind the desk of a person elected to run the nation's healthcare system. You have a diverse assortment of policies to choose from: You can experiment with the current U.S. health system or implement a government-, employer-, or citizen-funded universal health program. There are several cost-control programs you can implement, including salary and budget caps, preset rate bases, HMO programs, and malpractice reforms. And you can choose whether to ration and manage healthcare, as well as whether to fund expensive advanced treatments.



Games for any mood: Save the nation's health system in the educational SimHealth, or blast evil zombies in the ultraviolent DOOM.

Although all of these choices sound a bit complicated, the game features detailed online help, along with an informative and witty manual. Coupled with Maxis's typically cozy mouse-driven interface, the easily available reference information makes learning about the complex issues underlying our nation's health system unintimidating. Still, you come away from the game appreciating why it took the White House crew longer than expected to firm up its proposal for revamping the system. (That proposal is one of the many that you can simulate in SimHealth.)

If you enjoyed SimCity, you'll probably like SimHealth. The actual gameplay is very similar—you adjust various aspects of a complex system and watch how the results affect economy and efficiency, as well as your own popularity as an elected official.

SimHealth was created by Maxis but was funded by a $350,000 investment by The Markle Foundation, a charitable organization whose goal is to use modern communication techniques to improve public education, public discussion, and public policy. If you want a better understanding of how various healthcare reform proposals will affect you, you'll find SimHealth a fun way to learn. The product retails for $39.95, but it can be purchased directly from The Markle Foundation for $29.95 by calling (800) U-CHANGE.

We're DOOMed. If Congress is concerned *now* about the level of violence in electronic entertainment, let's hope nobody mails a copy of DOOM: Knee-Deep in the Dead to Capitol Hill. This latest blastfest from ID Software (creator of Wolfenstein 3-D) is a graphic extravaganza that's completely free of the kinds of redeeming societal values found in SimHealth—unless you can find social value in cutting up mutant undead soldiers with a chain saw.

There's not much to describe in DOOM's gameplay. You wander through a planetary base shooting and *incinerating* various zombies and monsters with a variety of weapons. There are a few puzzles in the game—mainly finding switches and hidden passageways needed to move from level to level. As the game progresses, you'll upgrade your simple pistol to more powerful—and more gruesomely effective—weapons such as shotguns, chain guns, and rocket launchers.

That's not to say that DOOM is boring, though. No computer game you've ever seen has graphics and sound like this. Three-dimensional texture-mapped buildings, the smoothest scrolling you've ever seen, and tension-building sound effects draw you into DOOM's reality. The game is ultraviolent, with monster guts splattered throughout the levels as you play. I hesitantly admit feeling a perverse sense of pleasure when I figured out how to make a monster's guts actually bespatter the walls. This isn't the game to let your young children play when you're trying to teach them the evils of violence, as DOOM definitely glorifies it.

If you have a modem, you can sample the shareware first chapter of DOOM: Knee-Deep in the Dead free of charge by downloading it from a local BBS or an online service. Upon paying the $40 registration fee, you'll receive disks containing the first chapter along with the two nonshareware sequels, The Shores of Hell and Inferno. A retail version of the DOOM trilogy should appear in computer stores soon. Call (800) ID-GAMES for more info. ❐

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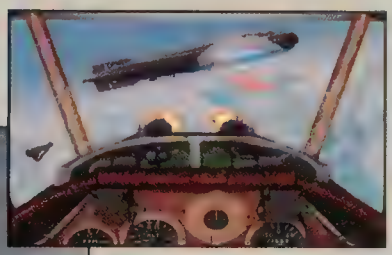

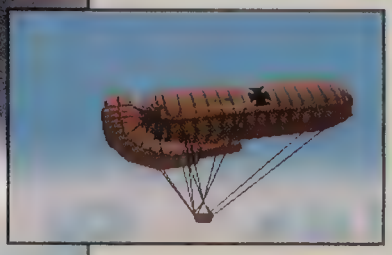

Actual screens may vary.

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ENTERTAINMENT CHOICE

You'll be so immersed in this game's stunning graphics and effects, you may get motion sickness.

Scott May

SHADOWCASTER

Shadowcaster fulfills the ultimate goal of any role-playing game: total immersion of the player in a farfetched fantasy realm. The true brilliance of Origin's next-generation adventure, however, lies in the ingenious ways it accomplishes this, not in the story itself.

The story is based on the usual fantasy fundamental—good versus evil—with a few atypical twists. For instance, instead of keeping track of multiple characters, you change into different personalities.

Less a role-playing game than an action adventure, Shadowcaster has a plot that is neither conceptually original nor blatantly derivative. You play the role of Kirt, a modern descendant of an extraordinary race known as The People. The gods gave your ancestors the power to shape-shift (called morphing) into the form of creatures. Sadly, only a chosen few received the power, and they abused it to create a social order divided by magic.

The upper echelon fostered a subclass of malcontents. From the ranks of the abusers rose Malkor, an outcast god who bestowed a more decadent power of morphing upon all who worshipped his wicked ways. The most brutal and vile of this new breed is Veste, who almost succeeded in defeating the powers of good. Banished to a distant temple, Veste vowed to return and destroy all who oppose him.

Distressed by this misuse of power, the gods withdrew the gift of morphing. Only you, as Kirt, the last child to be born with full power, can save the villagers. You must search the ruined city of The People, confront Veste, and end Malkor's reign of terror.

Dazzling first-person graphics are the game's hallmark feature, driven by the same ultrafast 3-D engine pioneered by Id Software, creator of Wolfenstein 3-D and Doom. Unlike those slightly claustrophobic efforts, much of Shadowcaster takes place outdoors, with stunning mountain peaks rising in the distance.

Texture-mapped polygons help deliver blazing full-motion speed and startling detail in walls, floors, and ceilings. On an 80486, open the window nearly full-screen for best results and be prepared for motion sickness.

Key to your success are six obelisks scattered about the multifarious landscapes. Touching these mysterious monuments enables you to morph into the shape of a fantastic creature from another plane. The Maorin is a 400-pound, six-limbed cat with razor-sharp claws; its specialties are speed, jumping, and cat's-eye vision. Quite different is Caun, a two-foot-tall elflike humanoid able to make light, grab items from a great distance, and form protective shields and cloaks. The Opsis are one-eyed floating orbs capable of throwing missiles, fireballs, and blasts of cold air; they can also see beyond normal range, increasing the effectiveness of the game's built-in automapping feature. Kahpa are large green froglike beings who are tireless swimmers and tenacious fighters; they're able to attack with sonic waves and electric shocks. The Ssair, legless flying red dragons, breathe fire and inflict great damage with their pointed tails. And Grost, a powerful stone giant, can punch through walls, paralyze with a

touch, and cause earthquakes by stomping its feet. Very durable, it can withstand most attacks and survive extremely hot temperatures.

Each morph drains various amounts of your energy. The shape-shifting graphics are mesmerizing, and morphing brings several fascinating new turns to the often stagnant fantasy genre. Gone are the complex logistics usually involved with a large group of adventurers; your self-contained multiple identities represent the ultimate in role-playing economy. Instant personality changes give you combat readiness, terrain adaptability, and stopgap health protection. For example, if you're taking a pounding in one form, change to a more durable one. When the attacks have waned, change to a healing personality, such as Kirt or Caun.

One of the only drawbacks to the game's one-man army is lack of efficient inventory management. Although you can view each character's supplies, the only way to trade items is to morph, discard, remorph, and pick up. More than just awkward and time-consuming, this wastes valuable power points.

Most of the game's 24 levels consist of convoluted maze running—solving puzzles, maneuvering treacherous passages, finding special objects, and fending off Malkor's evil horde. But whatever the design lacks in originality is more than made up for by its variety of settings and sensational visual effects. Along the way you'll also find weapons, armor, potions, and magic to aid your cause. The trick is not only knowing when and where to use special items, but which morph form is best suited to each job and situation.

The icon-driven player interface is a model of sparse, efficient design. Onscreen features, readily available with a mouse click, include character inventories, automapping, hands, compass, power and life bars, morph shapes, and special abilities.

Of particular interest is the Altitude Gem beside the main view window. Move this to help climb over or crawl under objects; while you're swimming, it allows you to dive or surface.

As many as four games can be saved in progress, displayed with a snapshot of your last location and descriptive text. Five difficulty levels assure challenging play for both beginners and pros. The rather slim user manual outlines the basics, but little more. Origin offers a separate clue book ($14.95), which is mandatory for your full enjoyment of the game.

The only recurring problem in an otherwise flawless design is with the game's multipurpose interactive cursor. Depending on your current mode or which mouse button is pressed, the cursor is used for walking, running, swimming, targeting weapons, spell casting, hand-to-hand combat, opening or closing doors, picking up or dropping items, and jumping. Although it's admirable that the designers could do so much with so little, it's easy (and often costly) to invoke the incorrect response during the heat of battle. Considering the speed at which this game moves, intelligent and intuitive controls are a must. Keyboard controls are provided, but they are not preferred.

Fortunately, this is one of the first titles to directly support Logitech's amazing CyberMan interface device ($129, 510-795-8500). A futuristic-looking meld of mouse and joystick, the CyberMan provides true 3-D multidirectional movement. Perfect for first-person maze exploration, CyberMan's control is so intuitive and responsive, it provides an almost virtual-reality experience. Shadowcaster also takes advantage of Cyber-

Man's unique vertical mechanisms; you can push down or pull up on the controller head to dive or ascend while swimming and flying. The game also supports CyberMan's tactile feedback function, via built-in motor, which delivers realtime physical response to onscreen stimuli: bumping into walls, fierce creature attacks, and even impaired footing while walking through muck. Overall, Logitech's CyberMan makes an excellent game even more dynamic.

In the vanguard of next-generation software, Shadowcaster is a near-perfect blend of traditional adventure and role-playing devices, with intense arcade action and first-person graphic flair. ❐

Circle Reader Service Number 393

IBM PC or compatible (33-MHz 80386DX or faster), 4MB RAM, DOS 5 or higher, 256-color VGA, hard drive with 16MB free, mouse recommended; supports Sound Blaster, Sound Blaster Pro, MPU-401 interface General MIDI, and compatible sound cards—$69.95

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THE FUTURE OF PC GAMES

By Scott A. May

Imagine for a moment that the evolution of computer games is like a stroll through a fantasy dungeon. Ten years ago, the dungeon walls would appear only as boxy outlines converging into darkness. Most sounds aren't even heard, but are announced on the screen in text form. Monsters, if visible at all, are flat and motionless.

Five years pass as you wander further down the dungeon passage. Walls now show some texture but little color; sounds, more like computer-generated noise, are barely audible. Advances in spot animation cause the characters you encounter to jump or twitch, but that's about it.

Now running, you enter the present day. The dungeon transforms into a multicolor mass of incredible detail. Torches flicker, making shadows dance, drawing attention to something moving just beyond your field of vision. Digitized sounds surround you and unsettle your senses: Footsteps fall and echo behind you, distant groans creep up from below, and ahead something huge growls angrily. A creature suddenly bursts from the darkness, claws thrashing, jaws biting in a flurry of animated special effects.

Assuming you survive this vicious assault, you stumble into an unmapped area of the dungeon. Texture-mapped graphics are replaced by photographic images. Not only can you (almost) smell the damp stone and faint wisps of brimstone, but you can *feel* rumbling beneath your feet and pick objects off the ground. A fellow traveler appears, with whom you carry out a spoken conversation. Unfortunately, your visit is cut short by an attacking monster, a holographic creation in full-motion video.

Feel free to apply your own favorite gaming genre to the above scenario—flight simulation, sports game, adventure game, arcade game, war game, or whatever. The point is this: The days of passive entertainment are gone. Welcome to the future of computer gaming!

Beyond Your Wildest Dreams

Outrageous? Far-fetched? Not really. Given the accelerated pace of PC technology, nothing is truly impossible. Consider this: Only three years ago, EGA graphics were on the cutting edge, and sound cards were virtually unknown. Most game developers struggled with the notion of supporting a startling new input device: the mouse. The idea of plugging a joystick into an IBM compatible, of course, was unthinkable. Just five years ago, requiring hard drive installation was almost unheard of; today it's taken for granted, with 20MB–30MB disk-based games considered hardly big enough to raise an eyebrow.

The technology that drove personal computers seemed to creep along in the 1980s. By the end of that decade, however, advances comparable to what once took ten years were accomplished in only five. Likewise, what once took five years took only two. Each accelerated leap in technology closes the gap further, until we'll soon measure breakthroughs in months, not years. Software developers call this riding the hardware wave. The lucky ones maintain their balance and enjoy huge rewards; others fall by the wayside, perhaps to surface again in calm water. One thing's for certain: If this is merely a wave, take a quick glance over your shoulder, because a tsunami approaches.

Peter Oliphant, creator of the futuristic computer game show LexiCross (Interplay), says that although game designers are often limited by present technology, they should set their sights on the future. "If I start a project knowing it will take me

carry computer gaming beyond your wildest dreams.

more than a year," he says, "I take the top-end system of the day and consider that to probably be the bottom-end system by the time I'm finished."

Asked about the near future of PC games, every designer and software publisher spoken to echoed Oliphant's response and indicated that the immediate future lies with CD-ROM. Capable of storing massive amounts of data—upwards of 650MB—CD-ROM is viewed as having four distinct advantages over current disk-based products: It's cheaper (for both manufacturer and consumer), it's more durable, it's compact, and it offers ease of installation. Many see CD games as a return of sorts to the plug-and-play days of early personal computers. Hard disk installation, if required at all, no longer means babysitting your computer, waiting to insert the next floppy disk. CD owners simply insert, initiate, and walk away. "Right now we're in a hardware explosion," Oliphant says. "CD-ROM is close to becoming the next total medium." Most major game publishers expect to move briskly away from disk-based products by the middle of 1994 and produce CD-only titles by 1995.

The only dark cloud on CD-ROM's brilliant horizon is speed. Ironically, as computers get faster—with 80486-based systems quickly becoming entry-level machines—data transfer speed takes a giant leap backward. "Slow CD drive access time is a horrible, crippling thing for the computer-games industry," says Ken Demarest, director of Origin Systems' new Interactive Movies division. Even double-speed CD drives—close to becoming a system requirement—are still at least ten times slower than the average hard drive. Even new quad-speed CD drives, although comparable to hard drives for data transfer, suffer from slow seek time, with prices that are still out of the reach of the average consumer.

Prepare to Be Dazzled

So what's ahead on the cutting edge of PC entertainment? Although some designers and publishers prefer to take a wait-and-see approach, many others are ready with knockout titles in development or ready for release. Each title promises to take PC gamers to levels of excitement and realism once only imagined.

Origin takes a bold leap into the future with BioForge, the first title in the company's new Interactive Movies line. This first-person, 3-D fantasy adventure blends several dynamic graphic styles, including photographic texture-mapping, ray-traced backdrops and set pieces, and 3-D–modeled characters, featuring realistic muscle tone and digitized facial expressions. The game's true innovation, however, takes place beneath the surface: Each character is built upon a 3-D–rendered skeleton, which was "trained" to move via full-motion body suits. Movement data created by this virtual-reality input device—called Flock of Birds, by Ascension Technologies—gives the game organic motion that's absolutely unparalleled in computer games, says project director Demarest. He adds, "We've achieved a wider range of movement than anything else on the market," movement that involves wrists and ankles and every joint in between. How about a sensor suit for home use? Don't hold your breath; these technical marvels currently cost more than $20,000 each.

Quantum Gate

Critical Path

BloodNet

BioForge

Stonekeep

Asked about live-action, full-motion video, currently the hottest industry buzzword, Demarest says his team prefers to work with "synthetics," a term that conjures up eerie sci-fi imagery. "Synthetic actors have a huge advantage in that they can do absolutely anything, at any moment, and you don't have to store pictures of what they did. This essentially gives you an infinite variety of motion in every scene," he says. Indeed, while products containing relatively small amounts of digitized video weigh in at hundreds of megabytes, BioForge is expected to require a total of 10MB–12MB (compressed) in its initial disk release. A CD version will follow, enhanced with Super VGA graphics, full-voiced characters, and perhaps even stereoscopic 3-D.

The New Hollywood

Origin, which recently built a Hollywood-style sound studio, has positioned itself to become a leader in CD-based computer moviemaking. "We want to create the genre," says Demarest. "Just as there are rules for what makes good cinema, we want to help create rules, or conventions, for what makes good interactive movies." Other works in progress include Ultima IX and X, the latter hoped by Origin president Richard Garriott (a.k.a. Ultima creator Lord British) to be the company's first true virtual-reality game. "We're looking seriously at VR peripherals, such as visors and gloves," says Demarest, though he doubts the use of such gimmicks will grow beyond a niche market.

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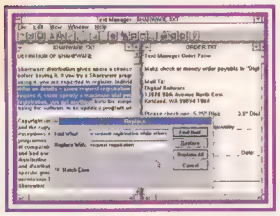

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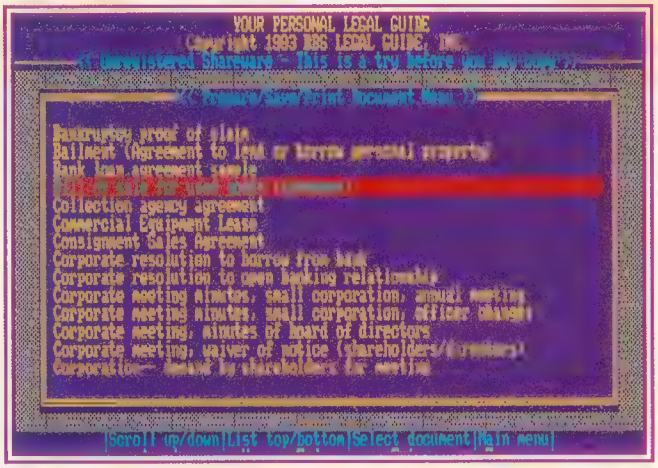
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Another software publisher on the technological forefront is Access Software, whose latest title, Under a Killing Moon, hopes to stretch the boundaries of adventure gaming. This huge, two-CD production features the digitized talents of such Hollywood stars as Margot Kidder, Brian Keith, and Russell Means. Set in the year 2042, the game's story follows the exploits of hard-boiled private eye Tex Murphy, who was last seen in the Access hit Martian Memorandum. Down on his luck and living in the mutant section of San Francisco, Tex makes ends meet by giving dance lessons on the side. When a friend hires him to investigate a routine burglary, the case leads Tex on a dark and dangerous journey which brings him up against powerful crime lords and bizarre cults. At stake is nothing less than all human life on earth.

Bruce Ward, technical director for the project, describes the game's photorealistic graphics, full-voiced characters, and freedom of movement as unlike anything seen or heard before on the PC. "What we're doing," Ward says, "is basically creating a new medium." The designers have essentially combined the speed of a virtual-reality engine similar to that used in Apogee's Wolfenstein 3-D or Origin's Ultima Underworld with hi-res (640 × 480) SVGA graphics. Ward says the graphics are incredible and notes that the player has total interaction within the game's 3-D environment—looking in, around, and under any object onscreen. Although the game is seemingly destined only for high-end machines, an adjustable game window lets those with slower machines reduce the picture size for better frame rate.

Meanwhile, at Interplay, Oliphant helps prepare the company's next-generation product, Stonekeep, which he describes as a first-person, full-motion, full-screen, virtual-reality dungeon quest. To be released first on disk, with a CD edition to follow, the game uses 3-D ray-traced foreground objects with texture-mapped, parallax-scrolling backgrounds. Unlike previous ray-traced adventures with static scenery and step-based movement, Stonekeep features smooth forward motion and approximately eight frames of "in-between" animation for every turn. Another unique feature is the lack of traditional onscreen movement and inventory icons. "Unless you actually call for an icon to appear," says Oliphant, "you can walk through the entire dungeon with a full, unrestricted view," thanks to effortless mouse control.

Experience the Future

Oliphant sees an exciting future for PC games, including the eventual implementation of virtual-reality devices such as visors, sensor gloves, and voice recognition. "Virtual reality is an attempt to tap directly into the human being's five senses, as opposed to conventional text, sounds, or screen imagery," he explains. "Virtual reality is an experience instead of an activity." He compares the game industry's current experiments with virtual reality to Hollywood's early attempts at enhanced audience participation, such as 3-D glasses, Smell-a-Vision, and Sensurround. He predicts that if voice recognition ever becomes 100-percent reliable—Interplay's Star Trek: 25th Anniversary CD edition supports this burgeoning technology—the computer keyboard will go the way of the slide rule after pocket calculators were introduced. Jerry Luttrell, director of public relations at Interplay, is more cautionary, saying, "Virtual reality and voice recognition are still at the novelty stage. If technology doesn't improve within the next year or so, people will start to lose interest."

A promising product recently completed is Total Distortion from newcomer Pop Rocket. Designer Joe Sparks calls the CD-based game, which was two years in the making, a large-scale music video adventure. You assume the role of a music video director touring the world, filming new acts, and pitching your video clips via electronic mail to the major studios. The story takes a weird sci-fi twist when you travel to another dimension in search of the ultimate music video

The Hollywood Connection

The "new Hollywood," as it's often called, represents the inevitable melding of two hugely popular entertainment mediums: motion pictures and electronic games. In the past few years, direct Hollywood influence in the computer-gaming industry has grown tremendously. Early entrants such as Walt Disney Computer Software and LucasArts have been joined by newcomers such as Paramount and Sony (which owns Columbia Pictures). This union of two giants is creating a lot of noise, as expected, but is it all flash and no substance? How does it affect the quality of future PC games?

Peter Oliphant, creator of LexiCross for Interplay Productions, sees at least one positive influence from the Hollywood connection: money. "Movie studios are masters of cash flow, which translates to higher production values for some lucky game developers," he says. Stonekeep, for example, features flame effects created by the pyrotechnics specialists who worked on the hit film *Backdraft*. Greg Tavares of Crystal Dynamics, whose game The Horde features video of Hollywood actors, agrees. "It's raising the stakes big-time," he says. "Budgets are starting to get enormous." Tavares also notes that some actors refuse roles in games that feature fantasy violence, an ironic stance considering the movie mayhem that inspires many computer-game adaptations, such as RoboCop, Terminator, and Rambo.

"It's getting big, really big," says Interplay's Jerry Luttrell. "It adds a level of professionalism that's becoming expected." He compares the computer-game industry to Hollywood's early years: "We're just creeping out of the silent era, but it's all happening very quickly." He also sees little danger of losing substance or gameplay values, because actors are usually brought in to augment already completed games. "I see these new games not so much as interactive movies," he says, "but an interactive experience with movie- or TV-like quality."

Software publishers have never hesitated to license the latest box-office smash, with hopes of translating that success to computer-game sales. Some are bona fide hits in their own right, like LucasArts' Star Wars and Indiana Jones series, while far too many others bomb from lack of viable gameplay.

The Hollywood–Silicon Valley connection also serves as fertile ground for actors looking to diversify their careers. Richard Sanders, best known as Les Nesman on the old TV sitcom "WKRP in Cincinnati," shows up as the voice of Bernard, lead character in LucasArts' Day of the Tentacle. Donald Sutherland can be seen in Virgin Games' political thriller, Conspiracy. Robby Benson lends his voice to Sierra's CD version of King's Quest VI.

Who knows? Perhaps someday, unknown actors culled from the Screen Actors Guild will launch their careers on CD-ROM.

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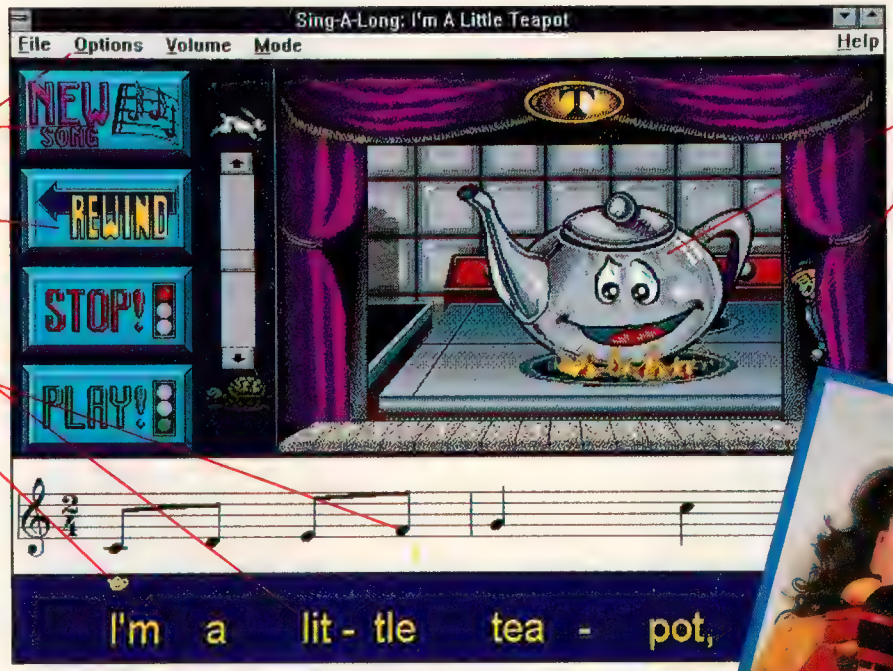

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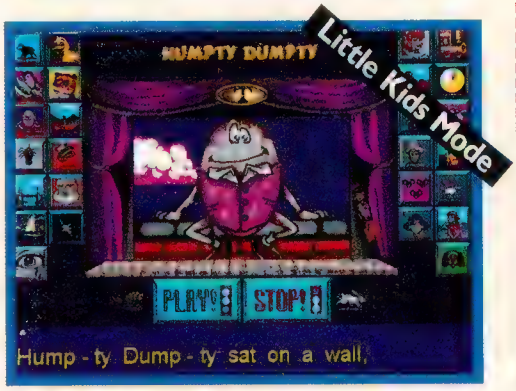

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act. Sparks says the game is huge, sporting many games within the game, including a full-featured music video editor and more than 50 full-length original songs. Other highlights include 3-D first-person perspective, digitized video, full-screen SVGA, and photorealistic graphics. Sparks, whose previous work includes the first color CD game for the Mac, Spaceship Warlock (on the Reactor label), says his new game automatically configures itself to exploit the strengths of high-end systems, while offsetting for the weaknesses of slower machines. Although Total Distortion—released first for the Mac, then soon after for Windows MPC—contains over 500MB of data, Sparks warns that mass storage doesn't equal quality gameplay. "It's really easy to fill a CD if you just want to fill it with data. All you need do is point a video camera out the window and let it roll," he says.

Other eye-popping new games that offer strong indications for the direction of PC games include Media Vision's first multimedia titles: Quantum Gate, Critical Path, and Peak Performance. The first title features Virtual Cinema technology by multimedia artist Greg Roach. Virtual Cinema is a fascinating technique that simulates realtime control of full-motion video. And Quantum Gate boasts more than 30 live-action characters from the Screen Actors Guild. Critical Path and Peak Performance also rely heavily on filmed actors, set against computer-generated backdrops, to simulate pulse-pounding, realtime action.

New from MicroProse is BloodNet, a cyberpunk/vampire role-playing game that challenges the imagination with mind-twisting animation and fantastic ray-traced art. This game is available on disk as well as in a full-voiced CD edition for PCs and compatibles. Producer Lawrence Schick (creator of Task Force: 1942) foresees growth in multiplayer and network gaming, whether through the traditional PC or so-called set-top systems such as 3DO or Sega-TV. "I've always found it more interesting to interact through computers than with them," Schick says.

Most designers referred to set-top machines with a combination of enthusiasm, curiosity, and doubt. Greg Tavares, a 3DO designer with Crystal Dynamics (whose products include Crash and Burn, Total Eclipse, and The Horde), would like to see a dominant gaming system that could combine the computing muscle of a PC with the graphic prowess and multiplayer potential of set-top machines. "There isn't a PC game that I can think of that you couldn't play on a 3DO," he says. "On the other hand, there are many games for the 3DO that you couldn't begin to play on a 486 or Pentium." Tavares thinks the biggest PC bottleneck is slow video, a problem only slightly allayed by local-bus technology. Other companies with high hopes for set-top systems include Origin, which claims that its Super Wing Commander will take the 3DO market by storm. Interplay's Oliphant predicts that the distinction between the personal computer and the videogame console will soon disappear completely. Veteran designer and game theorist Chris Crawford concurs: "I think there's a very good chance of seeing set-top boxes replace PCs for all except the hobbyist market."

Who knows what hardware will chart the future for PC entertainment—interactive laser discs, PowerPC, magneto-optic floppy disks, cable networking, or full-fledged virtual-reality devices? As long as players strive for the ultimate challenge, game designers will continue to reach just beyond what's now possible. And our gaming experiences will be fuller and more exciting than we can currently imagine. ❑

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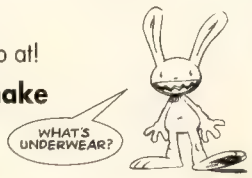

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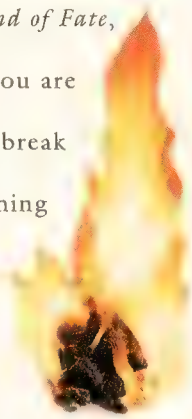

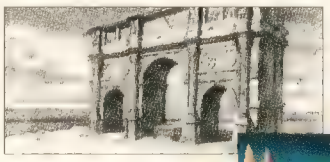

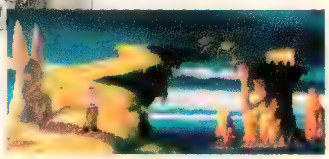

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The Computer Museum proudly presents the All-Star Computer Bowl® which will tip off on April 29th at The Civic Auditorium in San Jose. Satellite broadcast of the match will be transmitted to the Microsoft campus in Redmond and The Computer Museum in Beantown. Will this turn out to be a slam-dunk for the All-Stars from the East? Or will the in-your-face style of the Western All-Stars prevail? And what on earth does basketball have to do with computers? There's only one way to find out, and once again, tickets will be hard to come by since there will be no local TV play-by-play. Call (617) 426-2800 extension 399 now to reserve your seats.

THE 1994 COMPUTER BOWL PRESENTED BY THE ASSOCIATION FOR COMPUTING MACHINERY

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Bob Frankston
Microsoft Corporation
Mitchell Kapor
Electronic Frontier Foundation
Pamela McCorduck, Author
David L. Nelson, Novell Multimedia

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Sun Microsystems, Inc.
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David Liddle
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The Computer Bowl is broadcast on the PBS series, "Computer Chronicles", hosted by Stewart Cheifet. The Computer Bowl is a project to benefit the educational programs of The Computer Museum, 300 Congress Street, Boston, MA 02210.

For tickets and sponsorship information (617) 426-2800 extension 399.

The Computer Bowl

SENSORY SYSTEM I

If you're new to the world of multimedia, you're in luck—performance is rising, and prices are falling. The new Sensory System I, which is Multimedia PC Level 2 compliant, includes a double-speed CD-ROM drive, a 16-bit sound card, bundled software, and speakers for only $599 retail.

The kit includes a Sony CDU-31A-03 internal caddyless CD-ROM drive. The unit has a 300K-per-second transfer rate, has a 370-ms access speed, and is multisession Photo CD and CD-ROM XA compatible.

The Cardinal Technologies Digital Sound Pro 16 sound card includes a reprogrammable digital signal processor (DSP) from Analog Devices. The 11-voice stereo FM synthesis card is Sound Blaster, Ad Lib, Roland MPU-401 MIDI, Windows Sound System, and Compaq Business Audio compatible. It will even generate stereo effects for monophonic Sound Blaster applications. The interface for the Sony CD-ROM drive is on this card.

The sound card provides a mono microphone input, stereo line in and out jacks, a stereo amplified speaker out jack (four watts per channel—plenty loud for PC work), and a combination MIDI in/out and joystick port. The board can also connect to your PC's speaker.

The DSP 16 can record in stereo at rates of up to 48 kHz, but the included software only supports up to 44.1 kHz. The audio is clean, rated at 0.012 percent total harmonic distortion with 20 Hz–20 kHz frequency response and a signal-to-noise ratio of 84.8 dB. The DSP 16 also supports 8-bit ALaw and µLaw hardware compression.

The kit includes Labtec CS-150 battery-powered stereo speakers but no microphone. The speakers sound good for their small size.

Voyetra provides the sound software for DOS and Windows. The Windows program, Audiostation, incorporates a neat CD player (for audio CDs), a DAT deck (for playing and recording WAV and VOC files), a MIDI player, and a level/source volume controller. The Windows audio CD player remembers the names of CDs and individual tracks but not your favorite playlist. The recorder, WinDAT, supports mono and stereo 8- and 16-bit recording at 11,025; 22,050; and 44,100 kHz. It can convert from other sample rates.

The Windows MIDI player, Orchestrator, provides a 16-channel mixing board and can record from an external MIDI source. There's also a recorder for embedding sounds into Windows applications. These programs are fine starter applications, but they're limited in functionality and prone to an occasional rude crash.

Also included are five software titles on three CD-ROMs: Compton's MultiMedia Encyclopedia (1991), Arthur's Teacher Trouble (a great children's talking book in English and Spanish), MicroProse's Return of the Phantom (interactive mystery), F-15 Strike Eagle III (flight simulator), and David Ledbetter's Greens (golf).

The Cardinal Sensory System multimedia kit includes a double-speed CD-ROM drive and a 16-bit sound card.

A couple of upgrade options are enticing. First, the DSP 16 sound card has a socket for a wave-table upgrade chip (only $59 retail). This makes the sound output deeper and more realistic, though still not of professional quality. It provides 128 voices using the General MIDI standard. Second, the XingSound compression software ($79) provides MPEG audio compression, reducing recorded sound files by a factor of 12 : 1.

The Sensory System I is a good choice for those who like one-stop shopping and want the included CD-ROM software. Installation may be a bit easier using a kit like this, but there were still a few frustrations when I installed this system.

The Cardinal DSP 16 board is definitely worthwhile, and it's available as a separate item (with or without the wave-table chip installed). You may be able to buy the sound card and Sony drive separately for less than the cost of this package and then take the savings and select your own software. In any case, the price of admission to the multimedia theater just went down.

J. BLAKE LAMBERT

Cardinal Technologies
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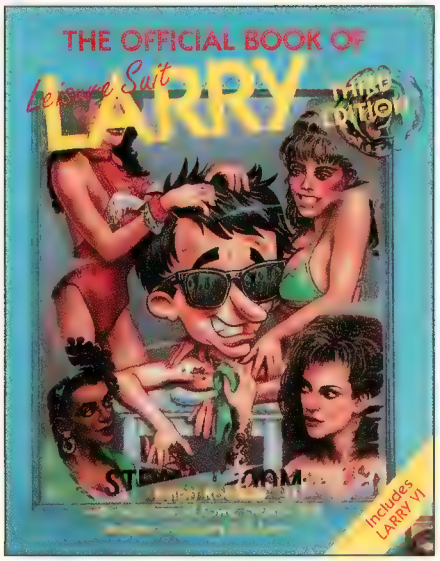
COMMWORKS FOR WINDOWS

If you're tired of swapping disks between PCs to transfer files using either sneaker net or the postal service, you might be interested in CommWorks for Windows, a bundle of programs for transferring files, accessing a remote PC, faxing, telecommunicating, and monitoring file directories. In addition to these programs, there's a Control Center button bar, which lets you launch any of the five applications or the Windows File Manager.

The heart of the package is LapLink V, a DOS program (which also runs seamlessly in a Windows DOS session) that provides simple, reliable, and fast file transfers between PCs. It works over serial (cable included), parallel, and modem connections. With LapLink V, you view the local PC's directories on the left of the screen and the remote PC's directories on the right, managing files of either at will. You can execute common tasks using the Synchronize, Clone Directory, and Refresh Directory functions, and then record the tasks and sched-



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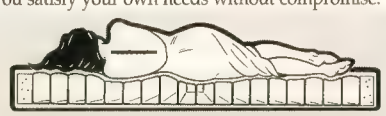
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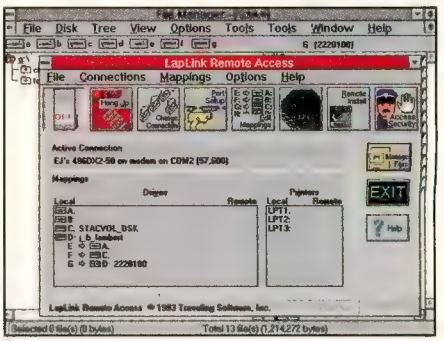
ule them to run unattended. LapLink V is especially good for keeping two PCs updated (a laptop and desktop, for example) and for transferring large portions of data from one PC to another (such as when you buy a new PC or replace a PC's hard drive).


File Disk Tree View Options Tools Tools Window Help
LapLink Remote Access
File Connections Mappings Options Help
EXIT
LapLink Remote Access allows you to access programs on a remote PC.

LapLink V can do its work in the background (via Windows) while you do other work. A remote-installation feature lets you transfer the program to a remote computer, and the program offers varying security levels, which you may assign to users.

LapLink Remote Access lets you connect two PCs via a serial, parallel, or modem connection (or infrared link). The machines form a mininetwork, so the drives and printers connected to each PC are simultaneously available to the other—even those on a network connected to one of the PCs. You need a fast 486 and a fast modem to use this program effectively via phone lines, but with serial and especially parallel connections, LapLink Remote Access moves along less slowly. It works in the background in Windows or in DOS, using a suite of DOS TSR programs to provide transparent access to the extra drives and printers.

TS Fax is a Windows fax modem manager which also works in the background. In addition to the basic fax-sending and -receiving functions, you can establish groups of recipients for automatic delivery and even forward faxes. The program also lets you mark up faxes using a few basic drawing tools; it has limited scanning support.

TS Online is a Windows telecommunications program for connecting to information services, bulletin board services, and other PCs via modem. The program supports a number of popular file transfer protocols and emulates several common terminals. You can record, compile, and play scripts, and the program includes some predefined scripts as well. The built-in text editor

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the Dreamers Guild

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PUBLISHER RATED GA General Audiences Fun for the whole family

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can handle eight files at once, and you can view GIF and RLE graphics while inside the program.

LapLink Alert watches over as many as 16 directories on your PC at once to detect any changes. When it finds a change, it lets you know by playing a WAV sound file or displaying a message. Unfortunately, it doesn't describe the change; it just tells you which directory has changed.

Overall, CommWorks is a pretty good package, and LapLink V and LapLink Remote Access are especially nice. LapLink Alert needs to provide more information to be really useful, and while TS Online and TS Fax are competent, they're not remarkable. For now, anyway, the file transfer and remote access programs are the real incentives to add CommWorks to your system.

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REBEL ASSAULT

If Origin's Wing Commander knocked your socks off, LucasArts' Rebel Assault will leave you with nothing but your skivvies. This CD-ROM sequel to last year's X-Wing represents a colossal achievement in game software. Never has the compact disc so flawlessly delivered digital animation, sound effects, and music—and never so beautifully.

Indeed, Rebel Assault is no less an achievement than *Star Wars* was in 1977. I was nine then, and I feel as much like a kid after playing this game as I did walking out of that movie theater over 17 years ago.

Set in the *Star Wars* time line, Rebel Assault casts you in the role of Rebel Alliance newcomer Rookie One. Though eager to tackle the Empire, you'll need to survive three training missions before earning an X-Wing. First, you'll pilot through Tatooine's rocky Beggar's Canyon to get a feel for ship controls (they're simple: left, right, up, and down). Then you'll navigate an asteroid field, blasting ice chunks in your path and dodging the rocks. Finally, back on Tatooine, you'll guide an A-Wing through an obstacle course.

Fast reflexes are a must as you maneuver your X-Wing fighter through narrow canyons at high speeds.

These missions provide a good taste of what's to come, and it's a bit unnerving. Rebel Assault is not an easy game. Not only is joystick control difficult to master (almost too difficult), but the foes you face are out for blood.

The fourth mission, for instance, pits you against no less than a star destroyer, which didn't get its name for being friendly. Subsequent missions vary in content, but all are challenging. There's a land run on Tatooine against Imperial Walkers, a chase through planet Hoth's ice caves, a blaster-to-blaster confrontation with Stormtroopers, and the obligatory Death Star trench run, among others. Changing perspectives add variety: Sometimes you pilot a ship from a third-person perspective, and sometimes from inside the cockpit. As with a true coin-op arcade game, missions are linear; you finish one and go on to the next. Lose all four lives, and the game's over.

John Williams's thrilling *Star Wars* score permeates the game and adds remarkable flavor. At first glance you'll say the graphics make Rebel Assault great, but it's the music that does it.

Still, the graphics merit attention. You'll see full-screen, full-motion video taken directly from the movie, along with professionally created add-in scenes and perfectly integrated game animation. Ultimately, the game must be seen to be believed. These are the most stunning arcade sequences ever seen on a computer screen. Unlike other graphics-intensive games, CD-ROM or otherwise, Rebel Assault doesn't suffer from jerky animation, poorly synchronized sound, or lengthy pauses between scenes. Everything about the game is remarkably fluid—almost cinematic.

At what cost? Another surprise: Rebel Assault runs perfectly on a single-speed CD-ROM drive. Beyond that you'll need at least a 386DX/33 processor and 4MB of RAM.

People will be talking about Rebel Assault for a long time. I recommend that you rush out and pick up a copy and find out why.

RICK BROIDA

LucasArts
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Circle Reader Service Number 436

ASKSAM FOR WINDOWS

If you've ever used a word processor to manage a database, you know it's a pleasant walk down a dangerous road—one that often ends in trouble. A new information manager, askSam for Windows, seeks to bridge the gap between word processors and databases, providing basic features of both in one product.

You can use askSam to manage structured databases, but it has special features for working with free-form text. You can even combine free-form and structured data in the same file. Each askSam file consists of one or more documents of up to 16,000 lines in length—files can be up to four gigabytes in size!

For example, you could import E-mail messages, memos, and letters into askSam as separate documents in one file and use askSam to find, view, and print them. If you already have the information you want to manage in electronic form, you'll be

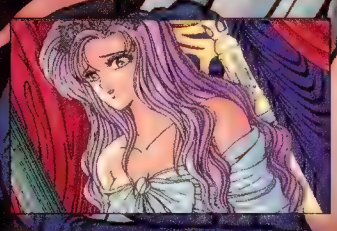
DRAGON KNIGHT III

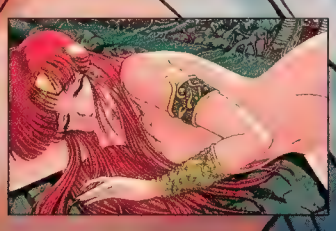
Enter a World of Demons and Damsels. If You Dare.

For centuries, war has raged among the demons and fairies, devastating this mystical land. Twin brothers, born to mortals, are separated at birth, chosen for the ultimate battle that will decide the fate of heaven and earth. They later meet, never knowing their true relation — or their own dark destiny. Fated to duel your twin to the death, you must fight to stay alive and rescue lovely, innocent maidens from the clutches of menacing foes. And perhaps, become the ruler of all.

So the challenge is on! An incomparable role playing fantasy game for your PC, with stunning, hand sculpted graphics throughout, numerous scripts and a thrilling plot. But be warned — with its voluptuous women and intense action, Dragon Knight III is for mature audiences only. And not for the faint hearted.

Available now at your nearest dealer or call **1-800-258-MEGA**. Or write Megatech, P.O. Box 11333, Torrance, CA 90510. Visa, Mastercard, checks accepted.





...ments: 286-20 or faster machine ...ded) with 640K RAM, hard disk, ... Operating Sys.: MS DOS 3.3 ... I. Graphics compatible with ... Sound Blaster, Sound Blaster ... Audio Spectrum, Adlib Gold ...

This game is not for the faint-hearted. Contains violence and some material inappropriate for minors under 18.

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REVIEWS

glad to know that askSam imports ASCII text, Rich Text Format, WordPerfect 5.*x*, and dBASE files.

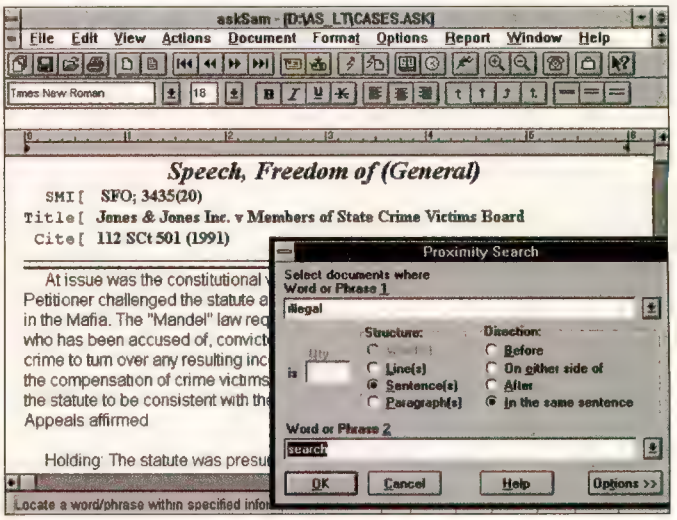
This product gives you useful options for importing long texts. It can automatically split a book (by paragraphs, pages, or using a special delimiter character) into many separate documents. Then you can easily use askSam's searching and viewing features to cross-reference and analyze the text.

With askSam, you can perform Boolean, numeric, date, field, and proximity searches (finding where two separate words or phrases both appear in close proximity in the text). You can highlight a word on the screen and search for it, or you can use the Show command to produce a new document that lists which passages contain the search word or phrase.

The word processor included with askSam is far better than what many databases offer, but it's not as powerful as top-ranking dedicated word processors. It doesn't offer macros, a spelling checker, or a thesaurus, but it does let you dress up your output.

Unfortunately, askSam for Windows 1.0 shows promise but lacks polish—I did encounter a few fatal crashes, and the program failed to recognize all the available fonts on my system. If you can work around the quirks in the current version, though, you'll find that askSam provides unique information retrieval power.

J. BLAKE LAMBERT



If you need to catalog and retrieve data from long text documents, askSam for Windows may be the tool for you.

askSam Systems
(800) 800-1997
$395

Circle Reader Service Number 437

SID & AL'S INCREDIBLE TOONS

There's something for everyone in Sid & Al's Incredible Toons, the new puzzle-solving game from Dynamix. Cartoon lovers will relish the zap-bang-boink sound effects, brightly colored characters, and wacky cartoon violence. Puzzle fans, especially those who enjoy Dynamix's Incredible Machine, will welcome the newer, tougher challenges found in Sid & Al's slapstick puzzle plots. And kids can "toon" in to the game's 30 Cake Walk levels, which are easy to solve and fun to watch. (Note to parents: These levels do employ graphic cartoon violence.)

As in The Incredible Machine, the goal in Incredible Toons is to solve puzzles by assembling a clockwork of cartoonish tools. These

TECHNOLOGY UPDATE

900 MHz breakthrough!

New technology launches wireless speaker revolution...

Recoton develops breakthrough technology which transmits stereo sound through walls, ceilings and floors up to 150 feet.

Breakthrough wireless speaker design blankets your home with music.

By Charles Anton

If you had to name just one new product "the most innovative of the year," what would you choose? Well, at the recent *International Consumer Electronics Show*, critics gave Recoton's new wireless stereo speaker system the *Design and Engineering Award* for being the "most innovative and outstanding new product."

Recoton was able to introduce this whole new generation of powerful wireless speakers due to the advent of 900 MHz technology. This newly approved breakthrough enables Recoton's wireless speakers to rival the sound of expensive wired speakers.

Recently approved technology. In June of 1989, the *Federal Communications Commission* allocated a band of radio frequencies stretching from 902 to 928 MHz for wireless, in-home product applications. Recoton, one of the world's leading wireless speaker manufacturers, took advantage of the FCC ruling by creating and introducing a new speaker system that utilizes the recently approved frequency band to transmit clearer, stronger stereo signals throughout your home.

Crisp sound throughout your home. Just imagine being able to listen to your stereo, TV, VCR or CD player in any room of your home without having to run miles of speaker wire. Plus, you'll never have to worry about range because the new 900 MHz technology allows stereo signals to travel over distances of 150 feet or more through walls, ceilings and floors without losing sound quality.

One transmitter, unlimited receivers. The powerful transmitter plugs into a headphone, audio-out or tape-out jack on your stereo or TV component, transmitting music wirelessly to your speakers or headphones. The speakers plug into an outlet. The one transmitter can broadcast to an unlimited number of stereo speakers and headphones. And since each speaker contains its own built in receiver/amplifier, there are no wires running from the stereo to the speakers.

Full dynamic range. The speaker, mounted in a bookshelf-sized acoustically constructed cabinet, provides a two-way bass reflex design for individual bass boost control. Full dynamic range is achieved by the use of a 2" tweeter and 4" woofer. Plus, automatic digital lock-in tuning guarantees optimum reception and eliminates drift. The new technology provides static-free, interference-free sound in virtually any environment. These speakers are also self-amplified; they can't be blown out no matter what your stereo's wattage.

Stereo or hi-fi, you decide. These speakers have the option of either stereo or hi-fi sound. You can use two speakers, one set on right channel and the other on left, for full stereo separation. Or, if you just want an extra speaker in another room, set it on mono and listen to both channels on one speaker. Mono combines both left and right channels for hi-fi sound. This option lets you put a pair of speakers in the den and get full stereo separation or put one speaker in the kitchen and get complete hi-fi sound.

These wireless stereo headphones have a built-in receiver.

Factory direct savings. Because of our commitment to quality and our factory direct pricing, we sell more wireless speakers than anyone! For this reason, you can get these speakers far below retail with our 90 day *"Dare to Compare"* money-back guarantee and full manufacturer's warranty. Through this limited time offer, the Recoton transmitter is only $69. It will operate an unlimited number of wireless speakers priced at only $89 and wireless headphones at $59 each. So take advantage of this special offer to fill your home with music. Your order will be processed in 72 hours.

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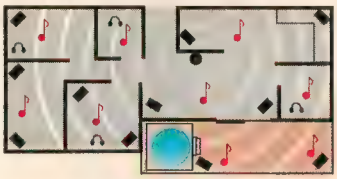
150 foot range through walls!

Recoton gives you the freedom to listen to music wherever you want. Your music is no longer limited to the room your stereo is in. With the wireless headphones you can listen to your TV, stereo or CD player while you move freely between rooms, exercise or do other activities. And unlike infrared headphones, you don't have to be in a line-of-sight with the transmitter, giving you a full 150 foot range.

The headphones and speakers have their own built-in receiver, so no wires are needed between you and your stereo. One transmitter operates an unlimited number of speakers and headphones.

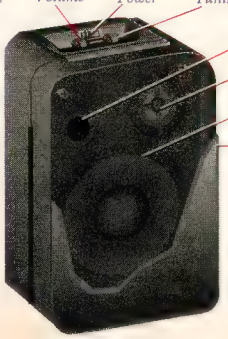


Recoton's transmitter sends music through walls to wireless speakers over a 75,000 square foot area.

AWARD WINNING WIRELESS SPEAKER

Built-in receiver and amplifier:

The wireless speaker and headphones both contain a built in receiver and amplifier. Signals are picked up and transmitted as far as 150 feet away through walls without the use of wires.



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Don't take our word for it. Try it yourself. We're so sure you'll love the new award-winning Recoton wireless speaker system that we offer you the **Dare to Compare Speaker Challenge.** Compare Recoton's rich sound quality to that of any $200 wired speaker. If you're not completely convinced that these wireless speakers offer the same outstanding sound quality as wired speakers, simply return them within 90 days for a full "No Questions Asked" refund.

Recoton's Design and Engineering Award

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REVIEWS

range from conveyor belts and catapults to elephants and vacuum cleaners. A puzzle's solution, which unfolds as you build and test your machine, often involves the smashing, shooting, exploding, or pinpricking of Sid Mouse or Al E. Cat, the game's hilarious main characters. Four collections of puzzles—nearly 100 puzzles in all—range in difficulty from the aforementioned Cake Walk to the brain-bending Looney Bin. There's also a Toon Builder for creating homemade puzzles and sharing them with others.

Nifty packaging, clever documentation, comical sights and sounds, and challenging gameplay make Incredible Toons a winner.

RICK BROIDA

Dynamix
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Sid & Al's Incredible Toons presents you with nearly 100 hilarious animated cartoon puzzles to solve.

THE EVEN MORE INCREDIBLE MACHINE

Don't look now, but someone forgot to lock the laboratory door. Too late! Those wacky Dynamix designers, Jeff Tunnell and Kevin Ryan, are loose again with The Even More Incredible Machine, a brilliant follow-up to last year's masterpiece of mental mayhem.

More of a replacement product than a sequel, the game combines the original's 87 levels with 73 all-new brainteasers. This version also adds 13 new machine parts, bringing the total number of goofy gadgets to 55. Among the latest additions are pinball bumpers, teapots, nails, wood and dirt walls, and super balls. Also look for Ernie Alligator and his favorite food, the blissfully dense Mel Schlemming, the human lemming. The new levels are bigger, funnier, and, as you explore more deeply, decidedly more difficult. The final five puzzles are guaranteed to stump even the most seasoned problem solvers.

The premise remains as simple as ever: Achieve each puzzle's goal by adding spare parts to a partially completed machine. Although the solutions often appear straightforward, your zany box of tools makes even the simplest task a mind-bending chore. Inspired by cartoonist Rube Goldberg's bizarre contraptions, the machines you can build are wonderments of home-brewed ingenuity. More than just silly animated fun, however, the game holds bona fide educational value. With an obvious few exceptions, the game's madcap mechanisms have been designed incorporating re-

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Mallard

al-world physics, resulting in surprisingly accurate cause and effect. Because there's no single correct solution to each puzzle, the program also encourages the use of creative thought and innovative strategies.

One of the game's best new features is the ability to build and share interactive puzzles with fellow machineheads. Whereas the original version allows you to build only self-running demos, the new system functions more like a genuine hands-on construction kit. The design process is a snap: First, assemble a fully working machine, preferably one that accomplishes an unusual task. Next, remove a series of integral parts and place them—along with several decoys—in the toolbox. Then lock the remaining items in place so that they can't be moved by frustrated puzzle solvers, write some descriptive text, and save it to disk. The resulting file can be freely distributed to other owners of the game. The Even More Incredible Machine is divine madness—a delightfully addicting, thoroughly intelligent arcade game that should not be missed.

SCOTT A. MAY

Dynamix
(800) SIERRA-5
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The Even More Incredible Machine adds 73 new brainteasers to Dynamix's Rube Goldberg–inspired puzzler.

IBM's MWave WindSurfer multifunction multimedia modem uses Digital Signal Processor technology.

IBM MWAVE WINDSURFER

It sends and receives faxes, links you to online services and other computers, answers your telephone and takes messages, and adds exciting sounds to your Windows computing. And it occupies only a single 16-bit slot in your computer. If the Swiss army had an official PC peripheral card, this could be it. However, IBM calls this the MWave WindSurfer, a name that suggests the device's ability to master the "waves" of communication, to hurtle your messages through the ether safely and skillfully at high speeds.

The genie responsible for all of this telecommunications magic is IBM's versatile and upgradable MWave Digital Signal Processor (DSP) chip. Its native computing power eases the computing load on your PC's CPU, allows you to run more than one MWave application at a time (for example, CD audio and a modem), and allows you to improve the performance of the MWave hardware through future software upgrades.

I tried the data and fax telecommunications functions, and everything worked as promised, logging me on to CompuServe, America Online, and (at 9600 bps) a local BBS. If you're interested in Prodigy, a starter kit comes with the MWave package. The included DataFax for Windows Lite sent faxes without a hitch. The voice-mail software also performed well, allowing me to record a greeting and receive messages. Compression keeps the messages from occupying too much space on your hard drive, and a log keeps tabs on up to 99 incoming or outgoing calls.

The WindSurfer supports MIDI in, out, and through and is MPC audio compliant, offering CD-quality sampling in both the recording and playback phases at rates up to 44.1 kHz and in 8- and 16-bit mono or stereo. In addition to stereo inputs and outputs, there's an internal connector that will accept CD audio from an internal CD-ROM drive; however, there's no CD-ROM interface on the card.

As powerful and versatile as it is, the card does have some limitations. At the time of this writing, only Trio's fax products work with the fax portion of the WindSurfer, although other fax software could be written or modified to work with the board. The data functions work only through Windows, but several Windows telecommunications applications work with WindSurfer. At the time of this writing, you can use only one telephone application (modem, fax, or answering machine) at a time. Also, though you can enjoy music while using the fax or modem functions, the limitations of the DSP place restrictions on how much you can do concurrently with this board. If, for example, you want to use the MIDI synthesizer and the modem simultaneously, you must set the modem to 2400 bps rather than 9600 bps. An IBM source tells me the company is working on new soft-

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Requires a 386DX PC compatible or better; hard disk drive; VGA graphics; 4 Megabytes of memory. A 486 is recommended. Multiplayer options require a network which uses the IPX protocol, a modem, or serial link. Digitized sound effects require a 100% Sound Blaster™ compatible card, Gravis Ultra Sound™, or Pro Audio Spectrum™-16.
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Circle Reader Service Number 237

REVIEWS

ware that will allow the WindSurfer to distinguish among fax, modem, and voice incoming signals and thus run more than one of the telephone applications simultaneously.

Because the DSP is programmable with new software, you might be able to look forward to new functionality, such as caller ID and higher transmission speeds, as well as new communications protocols.

As I write this, the WindSurfer doesn't support Sound Blaster–compatible audio under DOS, but an IBM spokesman says that by the time this review appears, the card will probably support some DOS Sound Blaster applications under Windows (for example, Stunt Island and Secret Weapons of the Luftwaffe).

If you're running out of slots and you're interested in sound and telecommunications, this all-in-one solution may be just what you're looking for.

MIKE HUDNALL

IBM
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THE LABYRINTH OF TIME

CD-ROM game remains something of an oxymoron. The expansive CD-ROM medium is most often used to store extra pictures, sound, and music, with additional depth a secondary consideration (if it is considered at all). CD-ROM games may be bigger and prettier than other games, but there often isn't that much *game* to them at all.

At first glance, Electronic Arts' Labyrinth of Time seems to fit squarely into that category. In a sense, it is the most basic of graphic adventures. You use a simple icon interface to stroll through a range of fantastic landscapes—from subway to hotel to mirror maze and so on—and collect objects that permit you to solve horizon-expanding puzzles. There's not much of a story. There are no characters to talk to. There's not much text at all, in fact.

And yet Labyrinth always manages to rise above the genre. The movement may be square by square, but each of those squares has four distinct views—many of them with gorgeous and unique closeups, from little signs to ray-traced detail work. The SVGA artwork is haunted by shadow and reflection and lit as if from within. The inventory feature isn't centered on a bunch of little cubbyholes; each object is granted its own screen. Doors open, the elevator runs, and the toilet works.

And I can't believe I've gotten this far without mentioning an intimidating cyclic score that rivals the very best music not simply for computer games but for any entertainment medium. It's stirring and frightening, and you will remember it long after the fan is silent and the monitor cold. This is one case in which those sleek extras that often

The ray-traced graphics in The Labyrinth of Time are like none you've seen before.

make *CD-ROM game* an oxymoron instead turn a potentially mundane adventure into a new creature. It's at once a game to play and a place to visit and lose yourself in.

The technical stuff never gets in the way of that experience. I had much less trouble getting Labyrinth going than most other CD-ROM products. It barely takes up any space on your hard disk—just a hundred bytes or so per save. And while the SVGA graphics can be a bit slow to load from a standard-speed drive, Labyrinth appears to store recently accessed screens in RAM, so flipping through each room's views needn't always be a chore.

Little here is a chore. All you need do is turn off the lights, turn up the sound, and allow yourself to be swept away. If I had to be lost in a labyrinth, this is the one I'd choose.

PETER OLAFSON

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401 GREAT LETTERS FOR WINDOWS

If you have trouble coming up with the right words when it comes time to write letters, 401 Great Letters can help you get started. While there are a few great letters in this package, most are simply adequate.

401 Great Letters includes a Windows text editor with fill-in-the-blank features for customization. If you'd rather work on the letters in your word processor of choice, or if you want to add graphics or fancy formatting, you can save letters as text or copy them to the

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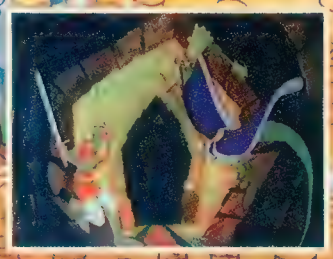

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Four classes of letters are available: business, customer, interoffice, and personal. They're conveniently subcategorized, so you can quickly find a letter that's at least close to what you need. The vast majority of the letters relate to business situations.

There are a few grammatical errors and inconsistencies, mostly harmless, and occasional idiomatic expressions which may be unfamiliar. Some of the letters have a harsh tone, which may not be appropriate for your particular purpose.

Still, the letters serve as a starting point for creating your own. They could be especially useful if you've had little experience with a particular type of letter and need help with important details. In many cases, with just a little editing, you can come up with a quick letter, memo, or contract that does the job—even if it's not a masterpiece.

J. BLAKE LAMBERT

MicroBase
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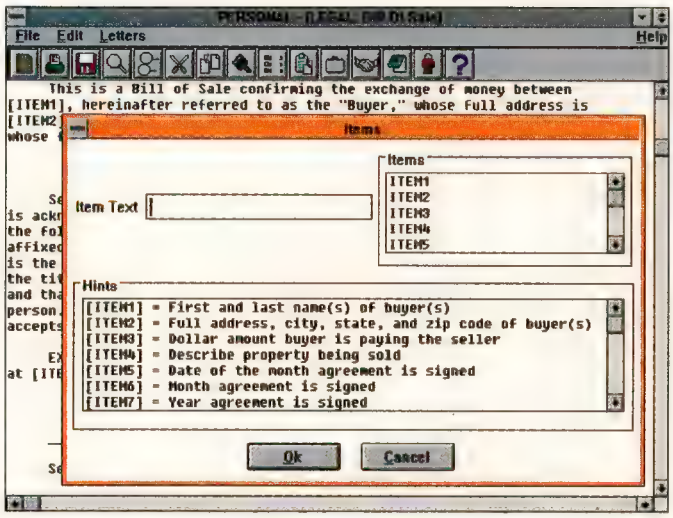
THE PATRICIAN

If you've ever aspired to trade your way through medieval Germany in the time of the Hanseatic League (and who among us hasn't?), check out The Patrician, a historically accurate trade simulation game for one to four players.

For those of you who slept through Hanseatic League day in history class, a patrician is any person of high rank or nobility—and the title you're striving for. Starting as a lowly trader with one ship and a few thousand drachmas, you must establish yourself as a reputable businessperson (your character may be male or female) by successfully trading 18 types of goods among 16 towns. As your fortunes grow, so do your opportunities. You'll share the wealth with townspeople, councilmen, and clergy, throwing lavish feasts and spreading bribes; you'll use your ships to fend off pirates; and, if all goes well, you'll be elected mayor.


File Edit Letters Help
This is a Bill of Sale confirming the exchange of money between
[ITEM1], hereinafter referred to as the "Buyer," whose full address is
Items
Item Text
Items
ITEM1
ITEM2
ITEM3
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ITEM5
Hints
[ITEM1] = First and last name(s) of buyer(s)
[ITEM2] = Full address, city, state, and zip code of buyer(s)
[ITEM3] = Dollar amount buyer is paying the seller
[ITEM4] = Describe property being sold
[ITEM5] = Date of the month agreement is signed
[ITEM6] = Month agreement is signed
[ITEM7] = Year agreement is signed
Ok
Cancel

401 Great Letters for Windows includes a Windows text editor with fill-in-the-blank forms for customization.

Once you're mayor and in the League, you'll continue trading and building your fortune. If you're lucky, the other members will acknowledge your business acumen by electing you Patrician of the League.

Getting started is simple; winning is another matter. The Patrician installs easily from two compressed disks, taking just 4MB of hard drive space. Copy protection requires you to find the proper coat of arms from an included map of cities and trade routes.

Setup aside, The Patrician is like a movie: It has interesting characters, a unique plot, gorgeous scenery, and an exciting musical score. Unfortunately, the script is muddled. Just learning to navigate through a town's various districts requires careful study of the manual, and discovering what to do in these parts is harder still. Making money seems impossible: You buy goods in one town and then can't find anyplace that will buy them at a higher price. There are fees levied with every port visited, so just searching for a profitable deal will run you into the red. Worst of all is the manual, which is poorly organized and lacking in vital gameplay information. It offers little recourse for the confused gamer.

Still, strategists love a challenge, and The Patrician is a humdinger. If complexity is the ingredient you've constantly found lacking in strategy games, The Patrician won't disappoint you.

RICK BROIDA

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Circle Reader Service Number 443

SCAN-IN-DEX

The problem with business cards is that they pile up. You get four at a business lunch, two more in a sales meeting, a handful at a trade show, and a mountain from friends and associates. These are valuable contact tools, but organizing, storing, and managing them is a frustrating task at best.

Enter Microtek's Scan-in-Dex, perhaps the most innovative business solution since the fax machine. The Scan-in-Dex is a dedicated business card scanner coupled with sophisticated optical character recognition (OCR) software. Together they perform minor miracles, extracting pertinent information from business cards and converting it for use on the computer. You can quickly build a database of names, numbers, and addresses, then store it as an online address book, mailing list, or contact manager.

About the size of a box of 5¼-inch floppy disks, the sleek-looking Scan-in-Dex plugs into an included proprietary interface card. Installation is a five-minute job, and the Windows software setup is easier still.

The software, which drives the scanner and performs the OCR, is a model of simplicity. The wonderfully uncluttered contact display shows fields for name, title, address, phone number, and so on. There's a space for adding miscellaneous notes about the person (like having the back of the business card to write on), and a small window displaying the scanned card.

Scanning is a breeze, requiring nothing more than the click of a button. Once a card is read, the data is interpreted and placed in the

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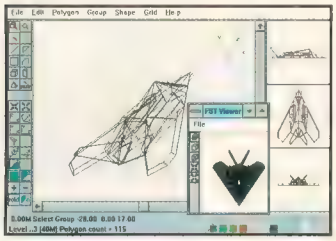
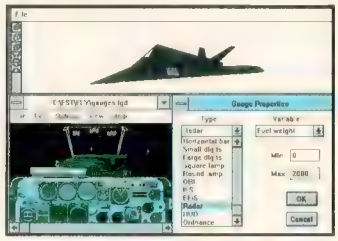


SHAPE EDITOR: Create your own plane or use one of the dozens included — like this Stealth fighter.



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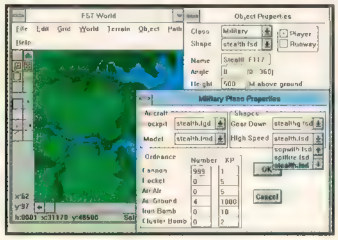

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appropriate fields. This is no small feat; the software performs with remarkable accuracy and intelligence, distinguishing phone numbers from fax numbers, names from titles, and so on. The entire process takes only about 20 seconds.

Of course, it's not flawless. The fancier the card, the more likely that fields will be garbled or left blank. Any errors or omissions may be corrected manually, however, and the software does have the ability to read vertical cards.

Contact listings may be printed or exported for use in full-fledged contact management software, such as Lotus Organizer or Contact Software's Act! for Windows. Only these two packages are supported, however, although listings can be exported in text or comma-delimited format.

Scan-in-Dex is an outstanding product. Microtek has developed an innovative solution to a long-standing business dilemma.

RICK BROIDA

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ANYVIEW

Switching video resolutions in Windows is a grind—stop everything, restart Windows, and then reopen your applications and files. With AnyView you can just click on a button, and zap! The resolution changes instantly. As long as you don't change the number of colors, you don't have to close a single window.

Since AnyView's intelligent installation senses your video setup, getting started couldn't be easier. You can change resolutions manually, or you can establish default resolutions for various applications.

AnyView provides an optional virtual desktop that's larger than your screen—when you get to the edge with the pointer, the screen scrolls in that direction. This is great for quickly moving around large documents in desktop publishing applications, for example. The Bird's Eye View shows you a reduced picture of your entire virtual desktop and lets you point and click to move to a particular spot. Zoom instantly magnifies the screen by changing it to a scrollable virtual desktop with 320 × 240 resolution.

AnyView's Arrange Windows Options lets you tell the program what to do when switching resolutions: resize, reposition, arrange icons, tile or cascade windows, and so on. The DPI WYZARD lets you calibrate your display in each resolution so that an inch displayed on the screen is an inch indeed—handy if you want to see items in their true proportions.

There are a couple of drawbacks to AnyView. The program uses its own video drivers, so you may not have as many options as you'd like. For example, the 1024 × 768 mode doesn't offer a large-font option when using the AnyView drivers. Also, AnyView's drivers may not be as fast as the drivers that came with your video card, especially if you use a Windows accelerator card.

Of course, I hope future versions of AnyView will address these constraints, but until then, I'll happily be using the current version to zap seamlessly from one resolution to another.

J. BLAKE LAMBERT

Scan-in-Dex is a specialized scanner that makes organizing your business card collection a snap.

AnyView's handy icon toolbar makes it easy to change screen resolutions and move around virtual desktops.

Binar Graphics
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$69.95

Circle Reader Service Number 445

GUITARWORKS ADVANCED EDITION

GuitarWorks Advanced Edition is a DOS program with a graphic interface that displays guitar chords and riffs while playing them through a sound board or MIDI device (there's also a forgettable built-in speaker option). GuitarWorks also serves as the platform for some useful add-ons, including a basic How to Play tutorial book and disk, as well as a more advanced $14.95 Scales and Riffs companion disk that includes the equivalent of about six months of guitar lessons.

The setup section contains a "tuner" that plays reference notes (it's not really a tuner). You can adjust the hardware settings, the sound of the guitar, the volume, the sustain, the speed of strumming, and the type and positioning of the on-screen guitar. GuitarWorks supports Ad Lib, Sound Blaster, and compatibles. The program also reads and writes Type 1 MIDI files.

The impressive Chord Dictionary contains over 5300 guitar chords, including 9 to 12 voicings (fingerings) for each of 44 chord types in all 12 keys. The voicings are good, but some are virtually impossible to play! Still, if you don't find a voicing you like, you can create one. GuitarWorks will also tell you the possible names for a chord you create.

To build songs, you copy chords to the Clipboard from the dictionary or create them as you go. This gives you a

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set of chords and riffs to work with when recording.

The Recorder emulates the functions of simple music recorders and sequencers: punch in (for overdubs), quantization (making notes exactly on the beat), cutting and splicing, and time and key shifting. To record, you play chords by clicking on them in the Clipboard, or you can pick single notes using the mouse to fret the guitar. You can even bend and slide notes. The Recorder can display songs using chord block diagrams or tablature notation.

There are a few limitations and frustrations, but GuitarWorks is a good, solid program. It can help you find the right chords, plan chord progressions, learn to hear different chord types and voicings, and revive or sustain your interest in the guitar.

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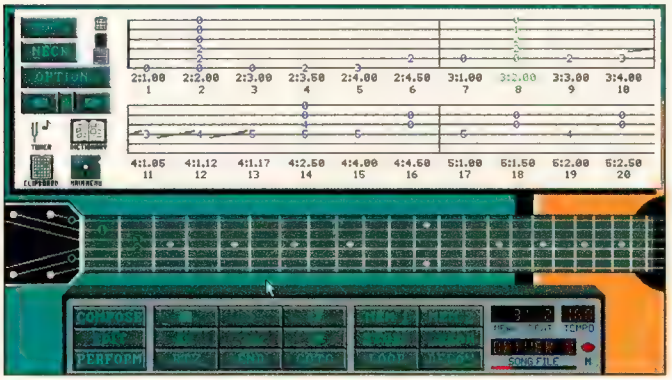

GuitarWorks Advanced Edition is a useful practice and tutorial tool for the beginning guitar player.

The beautiful California coastline at Pebble Beach makes it a very popular course for both real and electronic golfers.

HOME SURVIVAL TOOLKIT

Everyone has a list of household fix-ups crying for attention, and it's no secret that those of us who prefer to spend our time glued to computer keyboards are often inept at household repair.

The Home Survival Toolkit is a high-tech version of the traditional how-to books that are targeted at the would-be handyman. In fact, the book paradigm is so closely followed that this isn't even really a program—it's more like a clever use of the familiar Windows help system.

This nicely organized and easy-to-use reference work addresses a wide range of home repair subjects. Topics as diverse as fixing squeaky doors, unjamming jammed garbage disposals, mixing concrete, and wiring electrical outlets are covered.

Many options are provided to aid the novice handyman. An integrated hypertext glossary provides instant definitions for unfamiliar words. Colorful animations illustrate many subjects. Amateur plumbers, for instance, can watch an animation illustrating the mysterious mechanical workings of the toilet.

Overall, the package is clever and informative, but the multimedia billing is pretentious—anyone who is regularly using *real* multimedia software will be irritated at this misleading comparison. The Home Survival Toolkit comes on 3½-inch disks and installs on your hard drive.

The real question is whether or not this is a practical format for the information covered. This online book may be invaluable to those who are able to assimilate information only if it is presented on a computer monitor. Most people, however, would prefer to have the same material in an old-fashioned book that they can carry around the house while actually working on repair projects.

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PEBBLE BEACH: LINKS CHAMPIONSHIP COURSE

Pebble Beach. For a serious golf fan, just hearing the name triggers a series of vivid images of an icon of golfing history.

No single golf course in America is as recognizable, and the only real surprise about the release of the Pebble Beach course for Access's popular family of golfing titles is that it came this late in the series. Located on California's scenic Monterey Peninsula, Pebble Beach has been a three-time host of the U.S. Open and is a must-have course for any avid computer golfer.

As with all the Access course disks, the speed of the machine will be the critical factor in the level of detail displayed. On machines fast enough to avoid tedious delays as the screen is redrawn, Links remains one of the most enjoyable visual treats in the computer sporting world. And the beautiful and popular Pebble Beach course, without question, will be the best-selling release in the series.

Scenic beauty and painstaking attention to detail have long been the trademarks of Access's courses, and they have never been more apparent than in Pebble Beach.

This course disk can be used by any of the three Access golf games: Links, Links 386 Pro, and Microsoft Golf; you'll get the greatest level of detail with Links 386

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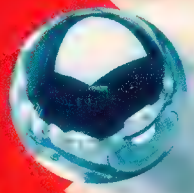

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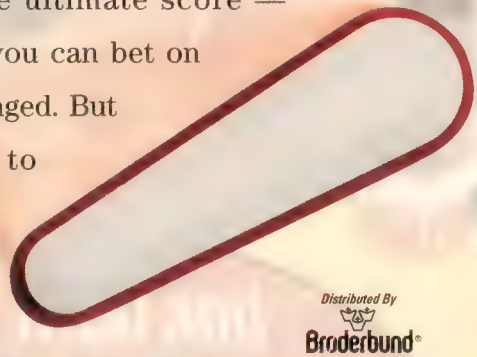

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Pro. The Pebble Beach package also includes a patch that will upgrade your Links 386 Pro game to the latest release. Access has hit another hole in one with this stunning hi-res course disk.

RANDY CHASE

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PC VISION PRO

Among the many alternatives for video capture, Calypso's PC Vision Pro stands out as a multimedia board that's simple and fun to use. The board works only under Windows and requires an 80386 with a VGA board that has an expansion connector (which is either an edge connector or a pin connector—check your VGA board's manual). If your VGA board doesn't have the expansion connector, you can buy a PC Vision Pro with a VGA board built in, thus saving a slot and a lot of extra cable connections.

The board features a tuner which can be connected via coaxial cable to an antenna or cable hookup, but I used the board exclusively to process composite input from a video camera and videotape. With a single menu selection, you can stream video input to your hard disk, creating a movie of a specified number of frames or capturing a single frame as still video. Several live special effects are available, including chroma key, solarization, posterization, and slow motion (capturing a still image every 2nd, 4th, 8th, or 16th frame).

The board also features a sound card which allows you to channel stereo sound through the system for capture with the Windows Sound Recorder. I had a bit of a problem with this option until I discovered that the vu meter in the PC Vision Pro sound mixer was incompatible with the Sound Recorder. You can run one to set the volume and then the other to record the sound, but you can't run both at the same time. Once I had this figured out, recording sound was a breeze. Why didn't I simply RTFM (Read The Fundamentals in the Manual)? It wasn't in the manual. The manual (soon to be replaced, the company says) is less than helpful and offers no assistance in troubleshooting problems, so I was burning up the wires to technical support throughout my PC Vision Pro experience.

My major problem was a weird conflict that we never did resolve. My mouse and modem would not work when my network card and the PC Vision Pro card were installed. Remove either card, and they worked just fine. It meant that each time I ran a program that required a mouse, I had to

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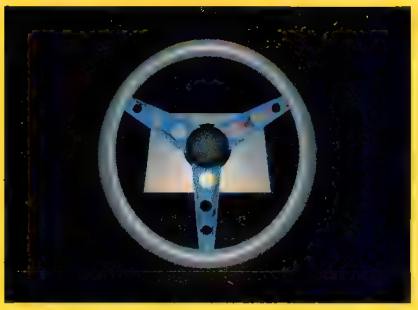

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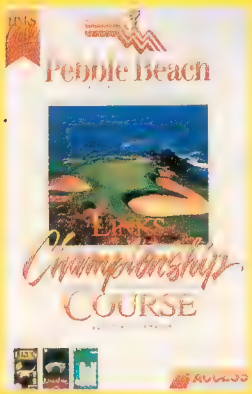

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PH006

REVIEWS

pull my network card. Though generally friendly, knowledgeable, and patient, Calypso's technical support could not determine what the conflict was, and neither could anyone else. I've long suspected my computer is haunted, so I'll add this strange conflict to the pile of evidence.

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INNOCENT UNTIL CAUGHT

Being an enormous fan of The Secret of Monkey Island, I was totally prepared to enjoy Innocent Until Caught, a futuristic adventure aimed at the same kind of audience, one that appreciates weird, funny games. Alas, IUC manages to be consistently weird but rarely funny.

The plot: You're Jack T. Ladd, a master thief who's been tracked down by the IRS of the future. You have 28 days to come up with a massive amount of back taxes before you're terminated with extreme prejudice.

IUC has a typical point-and-click interface, with Take, Use, Move, Look, Scan, and Talk icons. Items are placed in an uncomfortably small window in the corner of the screen, but otherwise, the interface works well.

The puzzles and humor are where IUC falls flat. To blow through a certain wall, for example, you place a mushroom on the ground and then release a giant fly. The fly dive-bombs into the mushroom and causes a wall-busting explosion. Not logical and not funny. Another example: Upon spotting a bar patron, Jack remarks, "If his beer gut was made of money, he'd be the richest guy on the planet." Ha-ha.

IUC's graphics are excellent, and the ray-traced opening animation is fabulous. The music is very generic (the equivalent of computer Muzak) and doesn't fit the game well at all.

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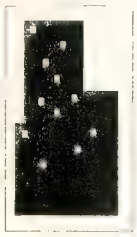

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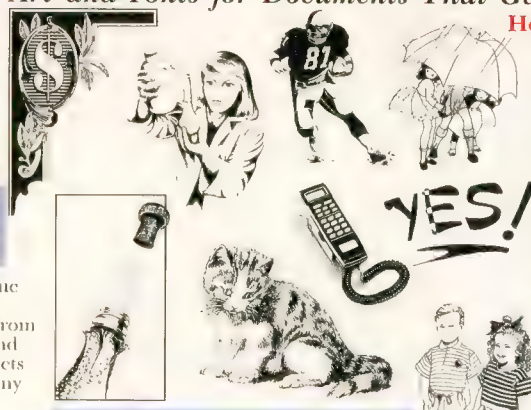

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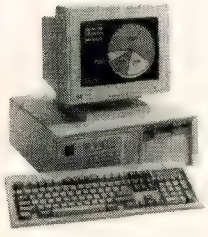

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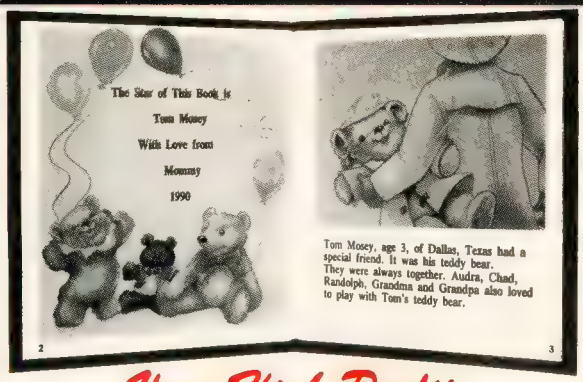
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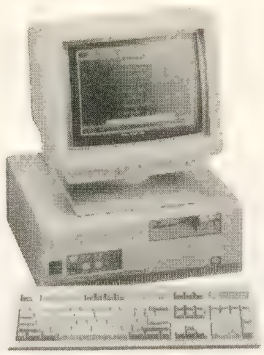

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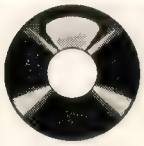

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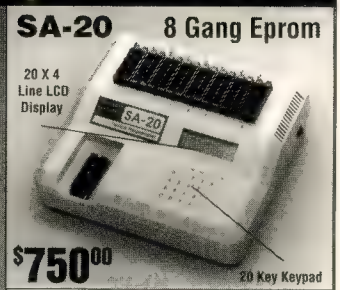

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continued from page 136

COMPUTE Caught Lying

An entire page in the April 1994 issue of COMPUTE was found to contain spurious information. The first page of the "News & Notes" column contained only a series of jokes, although companies and organizations mentioned on the second page of the column were quick to insist that their products were real. COMPUTE's entertainment editor, Denny Atkin, was quoted as saying, "April? *FOOLED* me!" as the men in white coats dragged him away.

Free Development

On Top Systems, following the lead of many makers of money management and tax preparation software, is offering its text-based DI-OGIX system for developing databases and spreadsheets free to the first 100,000 people who send $9.95 to the company for postage and handling. For further information, contact On Top Systems, P.O. Box 676, Northbrook, Illinois 60065-0676; (800) 454-4426, (800) 454-4490 (fax).

Is That a PG-13 Game?

Violence and adult themes have found their way into entertainment software. In response to parents' concerns, software publishers met at January's CES in Las Vegas to discuss creating a rating system.

The Software Publishers Association suggested software developers adopt a system similar to the one 3DO implemented in March. According to the labeling in 3DO's system, games rated *E* are suitable for everyone, *12* means parental guidance is necessary for children aged 12 and under, *17* denotes parental guidance for children aged 17 and under, and games rated *AO* are for adults only. By devising its own rating system, the industry can avoid the imposition of an outside regulatory body, which could delay product releases.

MS News Online

That's *MS* as in multiple sclerosis, not Microsoft. Now that the National Multiple Sclerosis Society has placed its MS library, which encompasses more than 200 MS-related topics, on American Online, subscribers have up-to-the-minute MS-related health information and can monitor the latest-breaking MS news.

Street Smarts

For travelers heading to New York, Chicago, San Francisco, Los Angeles, or Washington D.C., Taxi for CD-ROM is a Windows mapping software product with complete mapping data for the metropolitan areas of these five cities. For each of these locations, the program includes the entire city, its exterior suburban area, and its airports, as well as landmarks and, from Zagat Surveys, hotel and restaurant data. If you send in the registration card, you will receive in return a disk containing mapping information for Boston. Suggested retail price is $79.95 for the CD-ROM and $69.95 for the floppy disk version. Contact Middlegate, 28 Center Street, Clinton, New Jersey 08809; (800) 439-8294, (908) 735-0379 (fax).

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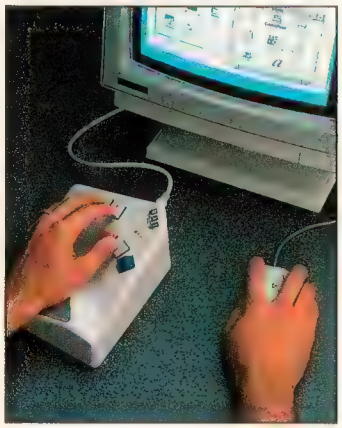

The real news: creating a videogame rating system, finding your way with Taxi, perusing the MS library on AOL, and typing on a one-handed keyboard

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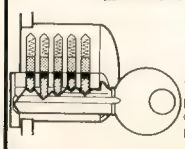

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NEWS & NOTES

Jill Champion Booth

Virtual coiffures take a giant leap forward with the introduction of the DataCurl PermManager on April 1.

MPC PU

Procreative Labs has announced the first multimedia scent card, the Smell Blaster Professional. This 16-bit card enhances multimedia and virtual-reality applications by giving your PC the ability to reproduce a variety of realistic scents, ranging from popular foods (for MPC cooking titles) to rotting flesh (for Id Software games such as Wolfenstein 3-D and Doom). Later this year Procreative plans to release the ASP (Advanced Stench Processor) add-on chip, which promises to add the ability to digitize your own smells. The company hopes to add support for the Q-Scent 3-D odor standard soon.

Patently Offensive

Compost Multimedia's announcement that it had received a patent for the use of the letter *V* in CD-ROM applications shocked the nascent MPC industry, but the company says it has set up reasonable licensing terms to allow other developers to continue using the character in their applications. "We used the letter *V* in an application way back in 1992," a company spokesperson says, "and I hardly think we can be faulted for protecting our intellectual property." Companies wishing to use the letter *V* in a CD-ROM application can do so by agreeing to allow Compost to manufacture their products and receive all profits from them, by signing employees' first-born children into indentured servitude at Compost, or by asking really, really nicely. Multimedia producer MediumVision expressed concern about the patent, saying, "We're wery concerned about the effect of this patent, but we don't think it has any real walidity, and we're sure our objections will be werified before these wampires wictimize other companies. In the end, the industry will be wictorious."

Pentium Emulator for 8088

Inthell announced its new Sizzler upgrade chip, a Pentium emulator for 8080, 8086, and 80286 machines. The Sizzler fits right over your current CPU and gives it many of the benefits of a Pentium. According to an Inthell spokesperson, "Naturally, we couldn't duplicate all the functionality of the Pentium on an 8088, so we decided to create an upgrade that simply heats up your current CPU to Pentium-

class temperatures." The main CPU may run faster with the upgrade, but Inthell says that isn't the primary benefit: "We want the customers of our earlier CPUs to be able to share the exhilarating feeling of computing on the edge." Although the Sizzler violates almost all EPA Green PC specifications, it's still the hottest upgrade of the year.

No More Words

Just weeks after shipping Microsoft Word for Windows 6.0, Microsoft announced Microsoft Word for Windows 9.0, which should be on store shelves by the first quarter of 1995. According to company officials, it will correct your spelling before you type a mistake, will use your sound card to complain if you use poor grammar, and won't allow more than four typefaces per page without proof of an art school diploma. It will also include a Wizard for writing reviews of Microsoft products.

UnIntel-ligent

Intel has announced it will sell its remaining stock of 286 chips to Chrysler, which will use the chips as the main processors in its 1995 line of economy cars. The move will help Chrysler lower the price of each car by about $400. Unfortunately, as the chips will run in real (non-multitasking) mode, you won't be able to run the radio and windshield wipers at the same time.

PSValuAmbraPoint/2

IBM has announced it will release 5000 different PC models this year under 600 different labels. The company figures that by offering fully 99 percent of the available computer models, it's virtually guaranteed to capture at least 20 percent of computer sales. According to IBM president Lou Gerstner, "Hey, it worked when I was at Nabisco."

BaconHead's Bottom 10

10. Multimedia Manilow
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continued on page 133

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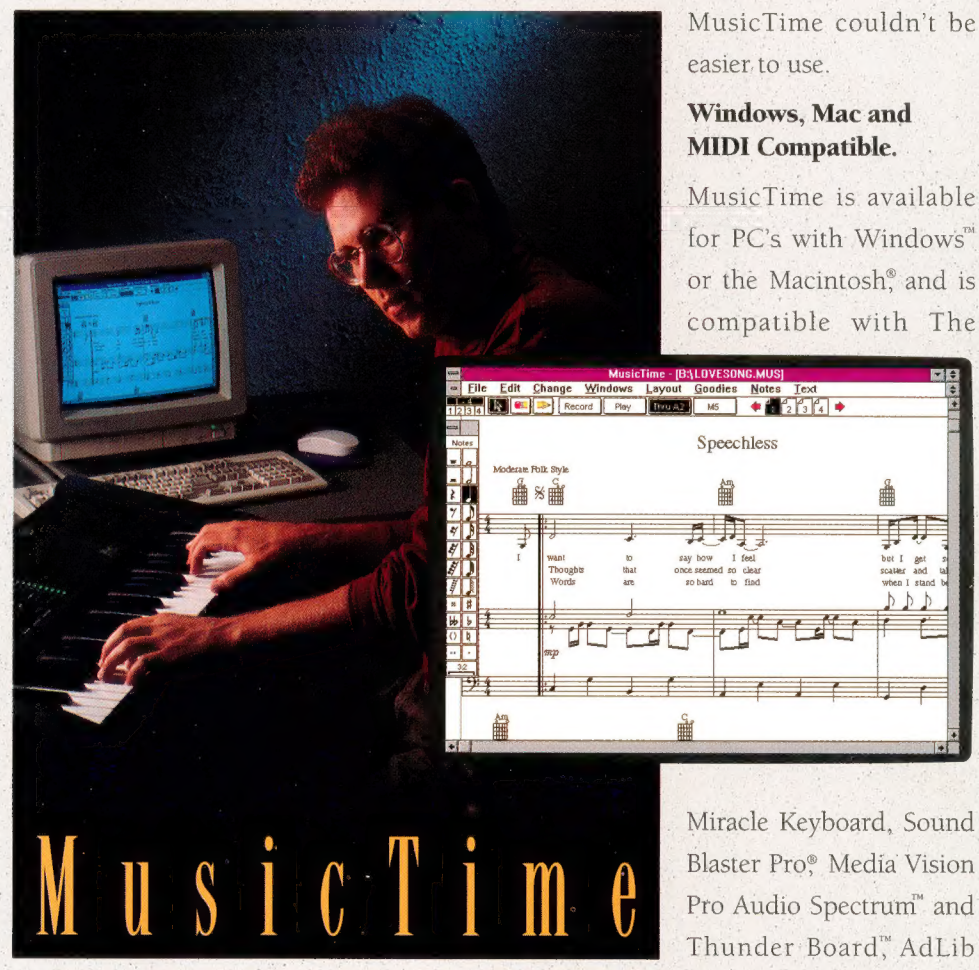
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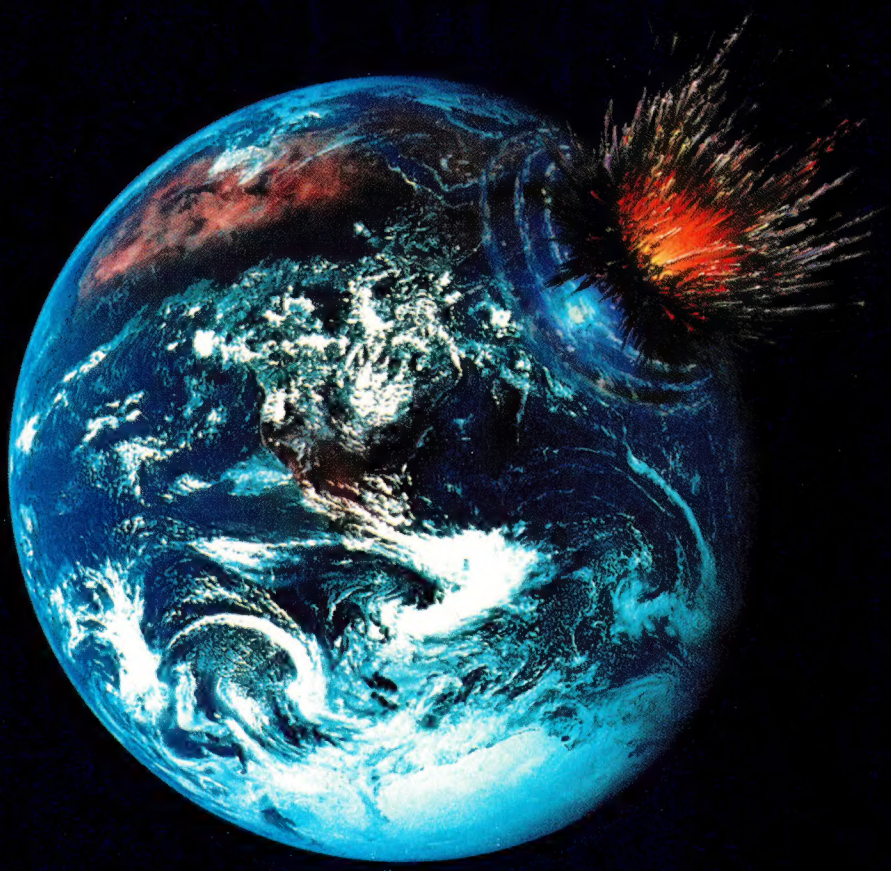

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